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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 7 1942

THE CLINICAL SIGNIFICANCE OF THE Rh FACTOR*

BY

K. E. BOORMAN B. E. DODD, B.Sc.

AND

P. L. MOLLISON, M.B., M.R.C.P.

The discovery of the Rh factor† (Landsteiner and Wiener, 1940) and the demonstration of its importance in various fields of medicine (Wiener and Peters, 1940; Levine, Katzin, and Burnham, 1941) have recently aroused the greatest interest. Not only has an explanation now been found for many of the hitherto unexplained haemolytic reactions following certain homologous-group blood transfusions, but also a dramatic advance has been made in the understanding of the haemolytic anaemias of the newborn.

It is well known that human erythrocytes contain, in addition to the A and B agglutinogens of Landsteiner, a variety of antigenic components. These other antigens, of which M and N have hitherto been the best known, are usually ignored by clinicians in the selection of blood donors because the corresponding antibodies occur only very rarely in human sera, and, moreover, these factors, although they act as antigens when injected into certain animals, very rarely stimulate the production of immune antibodies in man. By contrast, the importance of the Rh factor lies in its ability to stimulate the formation of specific immune agglutinins in man.

The presence of the Rh factor in certain human erythrocytes was first discovered by testing samples with anti-rhesus sera, prepared by injecting the blood of rhesus monkeys into rabbits. It was found that 85% of human bloods, irrespective of group, were agglutinated, whereas 15% were not. The former are termed "Rh-positive" and the latter "Rh-negative." Persons whose erythrocytes are Rh-negative are capable, under certain circumstances, of forming an antibody which reacts with the Rh antigen. This may occur after transfusions of Rh-positive blood or, probably more commonly, when a woman (herself Rh-negative) becomes pregnant with a baby whose erythrocytes are Rh-positive.

The first demonstration of the practical importance of the discovery of the Rh factor was made by Wiener and Peters (1940). These authors described 4 cases in which haemolytic reactions occurred after the repeated transfusion of blood which would ordinarily have been considered compatible. They were able to demonstrate that the sera of 3 of these patients contained an atypical agglutinin which gave identical reactions with the anti-rhesus serum. They showed that all 3 of these patients were Rh-negative and that the blood responsible for the haemolytic transfusion reactions was Rh-positive. Ten further similar cases were next reported by Wiener (1941). In many of these cases it was possible to show that the transfusion of Rh-negative blood was by contrast as successful as an ordinary compatible transfusion.

Slightly earlier, Levine and Stetson (1939) had suggested that immunization of the pregnant woman to an antigen contained in her foetus might explain the presence of atypical agglutinins in her serum and thus account for the comparative frequency of intragroup transfusion accidents in pregnant or recently delivered women. Later Levine, Katzin, and Burnham (1941) pointed out that these women in whom atypical agglutinins were found had often given birth to infants affected with erythroblastosis. They suggested that the haemolytic anaemia in the foetus might be due to the passage of the immune agglutinin across the placenta, with subsequent destruction of the foetal erythrocytes. At the same time they stated that the majority of the atypical agglutinins had been found to give reactions identical with those of anti-Rh sera.

The role of iso-immunization in the pathogenesis of erythroblastosis foetalis was more fully considered by Levine, Burnham, Katzin, and Vogel (1941). These workers showed that whereas only 15% of the random population were Rh-negative, of 153 mothers whose infants were affected with erythroblastosis foetalis 141 (92%) were Rh-negative. Of 76 infants and 89 husbands in this group who were tested, all were found to be Rh-positive. In 70 cases the mother's serum was examined within two months of delivery; Rh antibodies were demonstrated in 33 of these. From this examination it was concluded that iso-immunization of an Rh-negative mother to the Rh antigen contained in her (Rh-positive) foetus, with subsequent passage of the immune anti-Rh agglutinin back across the placenta, was the cause of the erythroblastosis in the great majority of cases. In the small remaining group, in which the mother was Rh-positive, it was considered that other blood group differences were responsible. Attention was drawn to the fact that 8 out of the 141 mothers had had severe transfusion reactions although homologous-group blood had been used (but no attention had been paid to the Rh grouping of the donor). In the same paper it was claimed that the affected infant maintains higher levels of haemoglobin and R.B.C. counts after transfusion of Rh-negative blood than after transfusion of Rh-positive blood.

The heredity of the Rh factor was considered by Landsteiner and Wiener (1941). They suggested that two allelomorphic genes—Rh and rh—were concerned, Rh being dominant. When the husband's phenotype is Rh-positive and that of the wife Rh-negative the phenotype of the baby will depend upon whether the husband's genotype is RhRh or Rhrh. If the former, the infant's genotype will always be Rhrh and the phenotype therefore Rh-positive; if the latter, the phenotype will only be Rh-positive in 50% of the siblings. These considerations help to explain the different incidence of erythroblastosis in different families.

From this brief consideration of the circumstances in which the Rh factor has been shown to play an important part, it is clear that tests for Rh antigens and antibodies have considerable application in clinical medicine. This paper seeks to confirm many of the observations reported above and to present some new findings.

Sources of Test Serum

Test serum may be obtained from two sources. Either an animal, preferably the guinea-pig (Landsteiner and Wiener, 1941), may be immunized by being given a course of injections of blood from rhesus monkeys, or serum may be obtained

* A report to the Medical Research Council from the S.W. London Blood Supply Depot.

† Throughout, the terms "Rh factor" and "Rh antigen" are used interchangeably, and the corresponding antibody is referred to as the Rh antibody, Rh agglutinin, or anti-Rh agglutinin.

from a human individual who has become immunized to the Rh antigen. In the first case the serum will always have to be absorbed, since it will contain other antibodies acting upon human erythrocytes. Furthermore, only certain animals produce satisfactory antibodies, and even from the good reactors only a small amount of serum will be obtained. The advantages of animal sera are simply that they can be produced at will and that their reactions are more uniform than those of human sera. By contrast, the advantages of using immune human sera for testing are that with good fortune a comparatively large amount of serum may be obtained with very little trouble. Unabsorbed human immune sera containing anti-Rh agglutinins can only be used for testing bloods of the same group or of group O, however, because, of course, they may also contain anti-A and anti-B agglutinins. These agglutinins either can be removed by absorption with appropriate human erythrocytes or, according to Wiener (1942), may be neutralized by the addition of saliva from individuals of groups A and B who are known to be "secretors."

In the present work a start was made by finding a serum, from a woman who had recently given birth to a baby with icterus gravis, which agglutinated the majority of bloods of its own group. The reactions were better at 37° C. than at 5° C. This serum was found to give reactions identical with those of a second similar serum that was obtained shortly afterwards, and the incidence of positive reactions produced by these sera suggested strongly that the agglutinins concerned were anti-Rh. Shortly afterwards, by the courtesy of the Rockefeller Institute, a sample of anti-Rh serum was sent to the Medical Research Council, and so it was possible to confirm that these human sera contained anti-Rh agglutinins. Through the kindness of Dr. Morgan of the Lister Institute we also had at our disposal some other samples of animal anti-rhesus serum obtained by the injection of guinea-pigs.

During the course of the work some 49 sera were found which contained demonstrable Rh antibodies. In accordance with the findings of other workers (Wiener and Peters; Landsteiner and Wiener; Levine, Burnham, Katzin, and Vogel) it was noted that the sera did not give entirely parallel reactions. The majority were observed to react with the same cells as those with which the animal sera reacted. A few sera, however, gave a higher percentage of negative reactions with a random selection of human bloods. Also, in occasional cases bloods were negative with one serum and positive with another. If human sera are used for testing, as they were in most cases in the present investigation, it certainly does not seem advisable to use less than 3 anti-Rh sera for testing (see also Davidsohn and Toharsky, 1942). At least 3, and often more, different sera were therefore used as a routine.

Test Cells

In agreement with the findings of Landsteiner and Wiener great differences were observed between the sensitivity of the cells of different Rh-positive individuals towards a given anti-Rh serum. Whereas with a given serum the cells of one individual may be completely agglutinated, those of another may show only a weak reaction. We have found that, although these differences are constant with any one serum, they differ from one serum to another, so that cells which react well with one serum may react poorly with another, while other cells may react poorly with the first serum but well with the second.

In examining a given serum suspected of containing anti-Rh agglutinins it is clearly advisable to test it against several different known Rh-positive bloods. Furthermore, in titrating the serum against Rh-positive cells it is essential to use the same cells for every estimation if accurate information is to be obtained about the changes in titre of the serum.

Technique of the Tests

Historical

In the reports of the first cases in which anti-Rh agglutinins were detected in human sera it was stated that the reactions were more pronounced at low temperatures and that no noticeable reaction at all occurred at 37° C. (Wiener and Peters). Accordingly, it was recommended that the mixture of cells and serum should be chilled. It was also suggested that the mixtures should be centrifuged before being examined microscopically for evidence of agglutination.

By contrast, sera described by Levine, Katzin, and Burnham (1941) were found to contain Rh agglutinins more active at 37° C. than at low temperatures. In a paper published a little later Wiener (1941) also recorded the finding of sera containing Rh agglutinins more active at 37° C. He stated that, despite the use of the centrifuge technique, no Rh agglutinins were found in 6 cases, in all of which there was a strong suspicion of their presence. At the end of the paper, however, Wiener refers to the fact that the tubes containing the mixtures of cells and serum from one of the cases showed a peculiar pattern of the sediment. In an article published soon afterwards (Landsteiner and Wiener, 1941) particular attention was drawn to this sediment pattern as a sign of a positive reaction. It was pointed out that after a mixture of cells and serum has been allowed to stand for some time the sediment at the bottom of the tube presents different appearances, according to whether or not agglutination has occurred. "Negatively reacting bloods [then] show a circular deposit with a smooth edge, while positive bloods have a wrinkled sediment with a serrated border or show a granular deposit."

It was pointed out that sometimes, in spite of a distinctly positive sediment picture, when the suspensions are examined microscopically the clumping may be quite weak. In our experience, rough treatment, such as sharp tapping of the tubes before the withdrawal of a sample for microscopical examination, can completely break up weak agglutination.

Using the cold centrifuge technique originally advocated by Wiener and Peters, we had several failures at first in attempting to demonstrate Rh antibodies. Later, by treating the mixtures more delicately and by working at a temperature of 37° C. instead of 5° C., it was possible to show that some of the sera examined did in fact contain Rh antibodies. Wiener (1942) has stated that the majority of Rh antibodies are more active at 37° C. than at 0° C., although in his opinion many of them are not much affected by alterations in temperature.

Procedure Recommended

(*a*) *Testing Unknown Cells.*—The following technique is very similar to that recommended by Landsteiner and Wiener (1941), although the importance of carrying out the tests at 37° C. when using human immune sera was first emphasized by Levine (1941).

A suspension of the cells to be tested is prepared by adding one small drop (0.02 c.cm.) of blood to 1 c.cm. of saline; the final concentration should be approximately 1 to 2% in terms of blood sediment. One volume of this suspension is placed with one volume of the test serum in a small tube, 7 mm. in diameter. As mentioned above, it is desirable to test cells with not less than 3 different sera. At the same time known Rh-positive and Rh-negative cells should be put up with the same sera to act as controls. The tubes should be left for at least one hour, and preferably for two hours, before being examined. For reasons discussed above, the tubes should be kept at 37° C. whenever possible, although with animal sera the reactions are just as satisfactory at room temperature (Wiener, 1942).

After the tubes have stood for one to two hours the sediment which has formed is examined, preferably with the help of a hand lens. The difference between typical negatives and positives has already been described, but it must be added that only the examination of a large series of sediments can make one familiar with all the possible appearances. When the sediments have been examined and the reactions have been scored, the sediment in each tube is gently mixed with its supernatant serum by means of a Pasteur pipette, and a little of the mixture is then withdrawn and spread on a slide, and examined microscopically. Usually, definite clumping is seen in blood taken from the tubes giving macroscopic positives. Occasionally, however, only very small agglutinates are seen despite a characteristically positive sediment, and, as we have said, harsh treatment of the mixtures in such cases sometimes completely abolishes the agglutination. Nevertheless we prefer to rely upon seeing agglutinates, macroscopically or microscopically, as a sign of a positive reaction, and simply to use the sediment pattern as a strong suggestion of the reaction to be expected. The danger of false negatives is of course reduced by the use of 3 different sera.

When the reactions are weak it may be very difficult to decide from the microscopical appearance whether the reaction is true agglutination or pseudo-agglutination (rouleaux-formation).

This is a further reason for the use of several different sera and for carrying out control tests with known Rh-positive and Rh-negative cells. Whenever sufficiently potent sera can be obtained it is desirable to add a volume of saline to the volume of serum and of cells in order to diminish rouleaux-formation.

(*b*) *Testing Unknown Sera.*—Sera suspected of containing Rh antibodies should be tested against at least 10 different group O bloods collected at random and also with not less than 2 known Rh-positive and 2 known Rh-negative bloods, using the technique described above. If the reactions are positive with the known Rh-positive bloods and negative with the known negatives, and if the serum reacts with the majority of the unknown group O bloods, it is practically certain that the atypical agglutinin is anti-Rh. It is advisable to test the serum with the cells of the individual from whom it came, to exclude the presence of abnormally powerful auto-agglutinins. If the latter are present they may be partially removed by leaving the serum in contact with its own clot at refrigerator temperature and then removing the serum while it is still cold.

(*c*) *Direct Matching Test.*—In any case in which there is a possibility that the recipient's serum contains Rh agglutinins it is most desirable to perform the direct matching test in such a way that reactions due to the presence of these agglutinins will be detected. As emphasized by Wiener (1942), Rh reactions are usually not detectable by an open slide method, and it is therefore necessary to set up the reactions in tubes as described above. We have tested the most potent anti-Rh sera that we have encountered against known Rh-positive cells, using the ordinary slide technique, and failed to detect any evidence of agglutination. It is therefore necessary to prepare a suspension of the donor's blood and mix it with the recipient's serum in a small tube as described above. Wherever possible the tube should be kept in an incubator for 1 to 2 hours; when an incubator is not available the tubes should be left to stand at room temperature for a similar period. Although it appears from Wiener's observations that occasional anti-Rh sera are more active at refrigerator temperature, it is our impression that such sera will prove to be very uncommon, and since testing at low temperatures introduces considerable additional difficulties it is suggested that in the present state of knowledge it is unnecessary to carry out a test at this temperature as well.

At the end of 1 to 2 hours the sediment at the bottom of the tube is examined, and the impression gained is confirmed by gently withdrawing a portion of the sediment and examining it microscopically. The least evidence of agglutination must be taken as a definite contraindication to the use of the particular donor.

When it is desirable to complete the test as rapidly as possible the tube containing the mixture of cells and serum may be centrifuged slowly at the end of 30 minutes (500 r.p.m. for one minute) (Levine, 1941). The tube is then gently shaken and the contents examined. We do not, however, consider this technique to be as reliable as that already described.

It may be emphasized that Rh agglutinins occurring in human sera are immune bodies and that therefore their titre varies considerably, according to the time which has elapsed since their stimulation by the Rh antigen. Following the transfusion of Rh-positive blood, for instance, there may be a negative phase in which the titre is low and it may be impossible to demonstrate Rh antibodies at all. During the next few days the strength of the antibody increases, and reaches a peak some 7 to 21 days after the transfusion. Thereafter the titre falls slowly.

Little evidence has so far been collected about the period of gestation at which Rh antibodies occur in cases where their formation is stimulated. We have, however, noted that the titre is low soon after delivery and that it rises to a maximum between 7 and 21 days later. The antibody may have practically disappeared in a few months or may still be detectable 5 years later, as in one of our cases.

Results

Random Samples of the Population Examined

A random sample of blood donors (all white; groups A + O) was tested with several human anti-Rh sera. All the sera used for these tests were considered to give similar reactions to the guinea-pig sera, and presumably correspond to the standard type described by Wiener (1942) or to the "No. 1 in our series" of Davidsohn and Toharsky (1942).

Of 1,610 cases, 1,371 (85.15%) were found to be Rh-positive and 239 (14.85%) Rh-negative. These figures correspond closely with those recently quoted by Wiener (1942) (of 777 persons examined, 14.4% were found to be Rh-negative).

Mothers of Infants affected with Erythroblastosis

Diamond, Blackfan, and Baty (1932) first suggested that universal oedema of the foetus, icterus gravis neonatorum, and anaemia of the newborn were all manifestations of the same underlying disease process and could be conveniently grouped together and known as "erythroblastosis foetalis."

Before mentioning the findings in a group of these cases, attention is drawn to the difficulty that is sometimes encountered in diagnosing erythroblastosis in the infant. Clinicians have stated that no line can be drawn between mild "icterus gravis" and physiological jaundice of the newborn (Hawksley and Lightwood, 1934). Certainly, if the passage of immune incompatible agglutinins across the placenta is accepted as the main causative factor in this disease, all degrees of severity will be expected.

According to Diamond, Blackfan, and Baty, the features which enable jaundice associated with erythroblastosis to be differentiated from "physiological jaundice" are its earlier appearance and greater duration, and the associated features of an excess of erythroblasts in the peripheral blood at birth and their persistence for many days or weeks after delivery, together with anaemia, splenomegaly, and hepatomegaly. However, even when these diagnostic criteria are considered there may still be doubt as to the diagnosis because great variations in all these features are encountered. In making observations upon the serological findings in the mothers of infants with erythroblastosis it has been thought preferable to keep to classical cases of the disease, and this we have done. Nevertheless, attention will be drawn to a group of jaundiced babies who possibly exhibit a mild form of the condition.

We tested 48 mothers whose babies had definite erythroblastosis; 46 of these were found to be Rh-negative, and in 44 cases Rh antibodies were present. In all 48 cases the infant was Rh-positive. In the 4 cases in which no Rh antibody was found in the mother's serum, other group differences were evident—e.g., the mother belonged to group O and the foetus to group A. The difference was always such that the mother's serum contained an agglutinin incompatible with the infant's erythrocytes. The possible relevance of this finding is discussed below. In 9 cases in which the mother's serum contained Rh antibodies the infant's serum was examined for the presence of these antibodies. In 8 cases in which the infant was 3 to 10 days old at the time of examination no antibodies were detected. In the ninth case, however, in which the sera of identical twins were examined within 24 hours of birth, definite Rh agglutinins were found in both. This is believed to be the first recorded instance of this finding.

The Rh agglutinins in the mother's serum were titrated at room temperature and at 37° C. in every case, using a standard technique (Taylor and Ikin, 1939), but the mixtures were handled more delicately than usual. In most instances the agglutinins were titrated at intervals after delivery, and these results will be reported separately. It may be useful, however, to mention that out of 41 cases examined within a month after delivery very high titres (over 512) were found in 3, moderate titres were found in 19, and very low titres (under 8) were found in 19 cases. These figures refer to the maximum titre recorded in each individual case; in the majority of instances the figures probably approach the maximum titre reached, but they do not necessarily do so in all cases.

Cases of "Physiological" Jaundice

As mentioned, this does not seem to be a sharply defined group. For the present purpose any baby developing jaundice has been included provided that there were none of the classical features of erythroblastosis described above and provided that there was reasonable evidence that syphilis, sepsis, or congenital obliteration of the bile ducts was not responsible for the jaundice. Tests were made in 24 mothers; 3 were Rh-negative. In these cases the baby was found to be

Rh-positive and the mother's serum contained an Rh antibody. Moreover, in one of these cases the mother had previously given birth to an infant affected with icterus gravis neonatorum. This finding suggests that certain cases usually diagnosed as physiological jaundice would be more properly regarded as mild cases of erythroblastosis. The supposition that the aetiology of some cases of mild jaundice of the newborn is connected with the passage of incompatible agglutinins across the placenta receives further support from the findings in the other mothers and infants investigated. In these the incidence of cases in which the mother's serum was incompatible with the infant's erythrocytes (due to the presence of anti-A or anti-B agglutinins) was considerably higher than the expected incidence in a random sample of mothers and infants.

(The concluding part, with a list of references, will appear in next week's issue)

TREATMENT OF SHOCK BY DIRECT ACTION ON THE VEGETATIVE NERVOUS CENTRES*

BY

LENA C. STERN, M.D.

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The Mechanism of Traumatic Shock

Efforts to produce shock experimentally play an important part in the elucidation of the mechanism of traumatic shock. The criteria of shock conditions in all these experiments were: (1) sudden and persistent fall in blood pressure, with a rapid and feeble pulse, (2) shallow breathing, (3) the absence of reaction on irritation, (4) lowering of the temperature. All this points to a disturbance of the vegetative nervous system, particularly the sympathetic, which in itself leads to a diminution of volume of the circulating blood, due to the accumulation of blood in the blood depots and diminution in the liquid part of the blood from plasmorrhoea. This disturbance of the vegetative nervous system is also a cause of chemical changes which characterize the course of shock (appearance of acidosis, diminution of glucose, etc.). This work also showed that with the weakening of the sympathetic nervous system there is a stimulation of the parasympathetic system which shows itself by a number of inhibitive effects.

Experiments made by us and our colleagues (Rosin, Chvoles) have proved that sensitivity, especially to pain, plays an important part in the development of shock. They showed that irritation of the skin by an induction current for 2 to 6 hours causes shock, whereas with preliminary anaesthetizing of the skin with novocain much longer electrical stimulation is without effect. Given the same conditions, shock is most easily produced by irritation of the skin on the inner surface of the thigh, the peritoneum, and the periosteum, whereas irritation of the dura even for as long as 8 to 12 hours does not cause shock. The rhythm of irritation is important, shock usually appearing much more quickly when the rhythm is quicker.

The significance of the preceding conditions for the development of shock in man has been proved by clinical observations. Excessive tiredness, prolonged insomnia, insufficient nourishment, fear, exposure, loss of blood, and, not least, painful irritations, lead, after transient overstimulation of the sympathetic nervous system, to its exhaustion and thus facilitate shock. The results of these experiments show that shock is caused, apart from loss of blood, by a whole complex of circumstances connected with a definite condition of the nervous centres. Only when all these conditions are present does shock develop. In clinical studies of shock, attention has been mainly directed to the functional state of the peripheral organs, such as the cardiovascular and respiratory organs. A more detailed analysis, however, has shown that all these cardinal changes, including the changes in metabolism and in the physical and chemical state of the blood and the tissues, are not actually specfic to shock. In fact, similar changes, such as a fall in blood pressure, diminished nervous reactions, etc., can be caused by a depression of the sympathetic nervous system such as occurs also in other pathological states. All these changes form a syndrome which characterizes shock and shock-like conditions and can be caused by action on the vegetative centres; this points to the important part played by the central nervous system in the production of shock. It therefore follows that in order to be able to understand the mechanism of shock and to apply useful therapy and prophylaxis one must concentrate on the functional conditions of the nervous centres, on their metabolism, and, in conjunction with this, on the character of the cerebrospinal fluid—i.e., their immediate nourishing medium.

* Translated by Dr. H. W. Swann.

Function of Cerebrospinal Fluid

The importance of the cerebrospinal fluid to the functioning of the nervous centres has been shown by observations in laboratories and clinics for many years. These observations have proved that the cerebrospinal fluid (taken in its broad sense as the fluid which fills not only the ventricles of the brain and the subarachnoid space, but the whole of the perivascular and pericellular spaces of the brain tissue) is the immediate nourishing medium of the central nervous system. The chemical composition, as well as the physical, chemical, and biological character, of the cerebrospinal fluid mainly depends on, and is determined by, a special mechanism—the so-called haemato-encephalic barrier. The anatomical substratum of this barrier is, apart from the vascular plexus, the capillaries and precapillaries of the brain, in the first place their endothelium. The haemato-encephalic barrier has a great selective capacity, on account of which not all substances which normally circulate in the blood, or get there accidentally, pass from the blood stream into the c.s.f. There takes place "a certain choice" as the result of which a relative constancy of the composition of the c.s.f. is maintained, and there is a certain independence of possible changes in the consistency and quality of the blood.

It has been shown that not only the introduction of abnormal substances from the blood into the c.s.f., but even a simple disturbance of interrelations between the normally existing substances in the c.s.f., such as between certain electrolytes, causes a more or less severe reaction in the nervous centres which sometimes leads to the death of the animal. In certain cases we were able to notice that definite changes in the c.s.f. are accompanied by some features which resemble the complex of symptoms characteristic of shock and similar states. This particularly applies to the ions of Ca and K. It was shown that change in the concentration of these ions in the c.s.f., leading to a change in the coefficient K/Ca, has a very strong influence on the condition of the central nervous system, particularly on the vegetative centres. For example, the introduction of minimum doses of Ca salts directly into the c.s.f., especially into the ventricles, brings about in the animal a condition of severe depression, whereas the introduction of minimum doses of K salts produces pronounced excitement. This suggests that the direct cause of the change in the functional condition of the cerebrospinal system may be a corresponding change in the composition of the c.s.f. Comparing the occurrence in shock of changes in the different physiological systems, particularly in the cardiovascular and respiratory systems, with the action which causes a stimulation of the vegetative nervous system, we conclude that the sympathetic and parasympathetic nervous centres play the most important part in the production of shock. The cause of changes in the vegetative nervous centres may be strong irritation coming from the periphery. The intensity of effect brought about by such irritations depends on the preceding condition of the vegetative centres (their greater or lesser excitability and reactivity), which in itself is closely connected with the chemical composition of the c.s.f.

The possibility of varying the reaction of the sympathetic and parasympathetic centres by introducing into the cerebrospinal canal certain substances such as K salts and Ca salts points to the influence of the electrolytic composition of the c.s.f. on the condition and activity of the vegetative nervous

system. Diminished tone of the sympathetic centres causes those disturbances of function characteristic of shock, and especially of the haemodynamics, the disturbance of which is quite sufficient to bring about in different physiological systems those changes which characterize shock. It is therefore understandable that all efforts to combat the signs of shock are mostly directed to the re-establishment of circulation and the normal action of the cardiovascular system.

Failure of Shock Therapy

However, the ordinary methods of fighting shock generally do not give positive results, because they do not influence the condition of the central nervous system. These negative results are explained to a great extent by the presence of the haemato-encephalic barrier.

As regards certain medicinal substances, it has been noted that, introduced into the circulation, they have no effect on the central nervous system, whereas the introduction of minimal quantities of the same substances directly into the cerebrospinal canal, particularly into the ventricles, often has a marked effect. The conclusion, therefore, is that in order to obtain a positive effect one should introduce the substance intrathecally. The action of a substance admitted into the general circulation differs from the action of the same substance introduced straight into the c.s.f. This applies particularly to those substances which are normally present in the c.s.f. and the blood, such as K and Ca salts and some hormones. Many experiments have proved that there is an antagonism between the central and peripheral parts of the vegetative nervous system as regards their reaction to the same substance. This antagonism more or less explains the absence of a positive anti-shock action of the medicinal substance when introduced straight into the circulation. Actually, if these substances do penetrate into the central nervous system, particularly the vegetative centres, they may produce an opposite effect and thereby neutralize the immediate action which they have produced on the peripheral vegetative organs. It follows, therefore, that in order to understand the action of a given substance one must take into consideration not only the permeability of the haemato-encephalic barrier for this particular substance, but also the fact that the substance which easily passes through the haemato-encephalic barrier into the c.s.f. may, on contact with the vegetative centres, cause an action which is opposite to the one on the peripheral organs. There is, therefore, an interference, and the final effect may be negligible or even opposite to the one expected. To produce a direct action on the vegetative nervous centres one must administer the substance directly into the c.s.f.

One must add that a positive effect can be obtained only in cases in which the given substance is introduced into the ventricles of the brain, whereas the introduction of the substance into the subdural or subarachnoid spaces is usually without effect because it passes rapidly from the c.s.f. into the blood stream and does not come into contact with the nervous centres.

Intraventricular Injection of K Salts

Laboratory experiments (Chvoles) have shown that in many cases of experimental traumatic shock the direct injection into the c.s.f. of a solution of K salts gave a positive result. In most of the experiments the signs of shock disappeared very quickly, the blood pressure rose rapidly to normal, the rhythm of respiration became normal, as also the reactivity and excitability of the animal.

It is interesting to note that in those cases in which trauma was accompanied by a severe loss of blood (up to 50%) the introduction of potassium phosphate into the c.s.f. without a preliminary blood transfusion brought the animal out of shock, whereas in control experiments the introduction of a physiological solution as well as a transfusion of blood had no effect. It appears, therefore, that under the influence of increased excitability of the sympathetic centres there is a mobilization of the blood from the depots and simultaneously a transference of fluid from the tissues into the blood, as a result of which the volume of the circulating blood is increased.

The best results have been obtained by injecting potassium phosphate directly into the lateral ventricles or into the cisterna magna, provided that definite rules are followed. If these rules are not observed, the injected fluid often does not reach the cerebral ventricles, but, following the normal flow of the c.s.f., passes into the subarachnoid space without reaching the vegetative centres. The introduction of the fluid into the subarachnoid space does not produce the necessary effect, because it passes into the blood stream very quickly without coming into contact with the nervous centres. It can now be positively stated that by fulfilling the necessary conditions as regards concentration, temperature, and reaction of the solution of potassium phosphate, as well as the rules of technique of its introduction into the cerebrospinal canal (i.e., the ventricles), a definite effect can as a rule be obtained. It is obvious that a positive action of potassium phosphate on the vegetative nervous centres is possible only if the centres have still retained the ability to react. Completely exhausted vegetative centres which have lost their reactivity cannot be re-established by this method.

Taking into consideration the fact that the introduction of potassium phosphate into the cerebrospinal fluid increases the tone of the sympathetic centres, its use is indicated in those cases in which symptoms of weakened tone are present. Irrespective of whether we deal with shock or a shock-like condition, we cannot possibly expect any useful effect in cases in which there is an anatomical injury to the vegetative centres. An effect can be expected only in a purely functional disturbance of the vegetative nervous system.

The time factor is of great importance. One obtains the best results in cases when the potassium phosphate is introduced into the ventricles of the brain within a short time after the appearance of shock. This applies not only to traumatic shock but also to anaphylactic, peptone, and histamine shocks. This can be explained by the fact that the exhaustion of the vegetative centres gradually increases, and when it reaches a certain stage the possibility of stimulating them by any method disappears.

The results obtained by laboratory methods have been fully corroborated by clinical experience and at the front. To obtain a positive effect 1 c.cm. of a solution of potassium phosphate in a concentration of 1/6 gramme-molecule, with *p*H of 7.6, was found best. Introduction of potassium phosphate into the lateral ventricles not only increases the concentration of potassium but also diminishes the concentration of the Ca ions, which leads to a considerable increase in the coefficient of the K/Ca ions. When the potassium phosphate is injected, one must remember the necessity for rapid penetration into the ventricles so that direct contact may be obtained with the vegetative nervous centres. Laboratory experiments, as well as clinical observations, have shown the importance of the preceding condition of the sick or wounded, particularly the increased excitability of the nervous system in the development of shock. In prophylaxis it is rational to counteract the increased excitability so as to prevent exhaustion, which causes shock, by giving sedatives, and blood transfusion when there is loss of blood. To prevent a possible relapse this prophylaxis can be successfully applied also in the initial stages of shock, as well as after the shock has disappeared. The first condition for preventing a repetition of shock syndrome in traumatic shock is the removal of the direct cause of shock, particularly the source of painful sensations, as, for example, by local anaesthesia. Fluid can be introduced into the ventricles of the brain by way of cisternal puncture. The following rules must be observed.

Technique of Cisternal Injection

The patient must be in a horizontal position (preferably on his left side); the head must be lower than the body and bent on to the chest; the lower limbs must be flexed (a position similar to Trendelenburg's). The landmarks are the external occipital protuberance and the first cervical spinous process. These landmarks are felt on the back of the head, which has been shaved and thoroughly disinfected. One fixes with a finger the skin between these two points and inserts the needle exactly in the midline at the level of the external auditory meatus. Sliding along the occipital bone one reaches the atlantoid membrane. The moment this membrane is perforated one hears a crackling sound. For this puncture one may use a graduated cisternal needle or an ordinary lumbar puncture needle. As a preliminary measure one estimates the length which corresponds with the depth of the puncture (from 4 to 5 cm.). The criterion that the needle has penetrated into the cisterna magna is the appearance of translucent c.s.f., which escapes

from the needle after removal of the stylet. On account of weak pressure in shock conditions the c.s.f. very often does not appear spontaneously and has to be drawn out by a syringe. After 1 to 2 c.cm. of the c.s.f. have been withdrawn with a syringe, 1 c.cm. of the solution of potassium phosphate, which has been warmed to body temperature, is injected with a syringe under a definite pressure, so that it penetrates into the ventricles. This method of treatment is very easy and can be applied at the front. The preparation of the potassium phosphate solution is not complicated, but must be done very carefully. The glass of the ampoules must be neutral. The solution is a mixture of the monometallic and bimetallic potassium phosphate (concentration 1/6 gramme-molecule), and can be prepared either from these salts (K_2HPO_4 and KH_2PO_4) or by adding the orthophosphoric acid to a solution of corrosive potassium up to *p*H 7.6.

As a rule the effect of this injection takes place in 1 to 2 minutes or even sooner (i.e., in the first place the blood pressure rises and the respiration becomes deeper). The absence of effect within a few minutes is generally due to the fact that the fluid has not reached the ventricles, as a result of the incorrect direction of the needle or of insufficient pressure. In these cases one must repeat the operation. When toxaemia is threatening—i.e., when toxic substances which form in the injured tissues enter the blood—the further formation of these substances must be stopped by excising the injured parts where possible; positive results, which are obtained by the direct action of potassium phosphate on sympathetic nervous centres, do not exclude the possibility of the appearance of toxaemic shock later on.

Conclusions

1. In the last phase of traumatic shock there is first of all a considerable fall in the tone of the sympathetic nervous system and a partial rise in the tone of the parasympathetic nervous system.

2. The most effective way of combating traumatic shock in its later phase is to raise the tone of the sympathetic centres by direct action on the vegetative centres; potassium phosphate simultaneously raises the tone of the sympathetic centres and lowers the tone of the parasympathetic.

3. By direct action on the nervous centres the ionic potassium causes an excitability of the sympathetic nervous centres, whereas the ionic phosphates, by concentrating the ionized Ca, cause a diminution of the tone of the parasympathetic nervous centres.

4. A direct introduction of potassium phosphate into the cerebrospinal canal contributes to a quicker action of this substance on the nervous centres and at the same time obviates the possibility of its opposite effect on the peripheral part of the vegetative nervous system.

5. The use of potassium phosphate as an anti-shock remedy is indicated in all those cases in which there is a diminution of the tone of the sympathetic nervous centres, such as a fall of the blood pressure, a lowering of cardiac activity and respiration, diminution of excitability, reactivity, etc.

6. Potassium phosphate must never be used in cases in which there is increased excitability of the sympathetic nervous centres, such as sometimes occurs in the first stage of shock.

7. If haemorrhage is present it must be arrested by all available means, because the considerable rise of the blood pressure through the introduction of potassium phosphate will definitely increase haemorrhage.

8. To avoid a repetition of shock it is necessary after the introduction of potassium phosphate to remove the actual cause of shock, in particular painful stimuli.

9. To ensure the direct action on the vegetative nervous centres, which are situated in the ventricles of the brain, potassium phosphate must be introduced directly into the ventricles. This is done by means of cisternal puncture. The fluid must be introduced with a definite pressure and the direction of the needle must be correct. The position of the patient must be horizontal, preferably on the left side, and the head must be lower than the body.

10. One must act quickly, without loss of time, so as to avoid a complete exhaustion of the vegetative centres.

11. The introduction of potassium phosphate does not exclude all the other measures against shock, especially blood or plasma transfusion.

12. Blood transfusion must be done in all cases where there is marked loss of blood. In other cases a blood transfusion is not absolutely necessary.

RECENT TRENDS OF SOME INFECTIOUS DISEASES

BY

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The results obtained by the introduction of new methods of treatment in certain types of infectious diseases have in hospital experience been almost dramatic. It seemed worth while to find whether any change could be shown in the number of deaths for the whole country from the numerically more important causes for which control has been attempted. The estimated saving in lives following the introduction of new methods forms an interesting speculation. The death rates cannot be used as a statistical index, since the populations at risk in 1940 and 1941 are not definitely known, so the ratio of deaths to notifications has been adopted.

Cerebrospinal Fever

The employment of chemotherapy in cerebrospinal fever has resulted in a very large decline in the fatality rate from this cause. A large increase in incidence of cerebrospinal fever occurred after the outbreak of war, an experience similar to that of 1914-18. The statistics for recent years in England and Wales are:

Year	Deaths	Notifications	Deaths per 100 Notifications
1934	729	1,080	68
1935	617	865	71
1936	635	967	66
1937	698	1,113	63
Average of 1934-7	670	1,006	67
1938	652	1,258	52
1939	517	1,500	34
1940	2,584	12,767	20
1941	2,163	11,073	20

If the average of the years 1934-7 is taken as representing the endemic level immediately before the general use of sulphapyridine, it will be seen that a great improvement has been effected. The fatality rate was halved in 1939, and in 1940 and 1941 it was less than one-third of the average value. On the basis of the average fatality rate of 66.60% during 1934-7, the expected number of deaths in the three years 1939-41 would have been 16,876. The number actually registered was 5,264, or 11,612 fewer than expected. This is probably an over-estimate, since in a period when a disease is prevalent fewer mild cases are missed and there tends to be a greater proportion of wrongly diagnosed cases than in non-epidemic periods—factors that produce a decrease in the fatality rate. The most recent pre-war epidemic occurred during 1931-3, when 5,919 notifications with 3,595 deaths were reported, giving a fatality rate of 60.74%. The expected deaths in 1939-41 on the basis of this fatality rate would be 15,392 —i.e., 10,128 in excess of the observed. An objection that could be raised to this comparison is that the conditions of life were vastly different in the two periods. To obtain approximately similar conditions of life—the aggregation of large sections of the population—it is necessary to go back to the last war. During the epidemic of 1915-17 there were 5,222 deaths and 8,068 notifications, yielding a fatality rate of 64.72%. Taking this rate as a standard, the expected deaths in 1939-41 would have numbered 16,400, or 11,136 more than were recorded.

It seems reasonable to suggest that as a consequence of the discovery and adoption of treatment by sulphapyridine about 10,000 lives were saved during 1939-41.

Pneumonia

The response of cases of pneumonia, particularly lobar pneumonia, to treatment with sulphapyridine has been very successful, and large declines in hospital mortality have been

recorded. The effect of this treatment on the mortality of the whole country cannot be measured directly by means of the case-fatality rate, since we have no knowledge of the number of cases. Many factors influence the trend of the mortality from pneumonia, and consequently large fluctuations occur in the annual rates. These variations prevent a straight comparison being made between the number of deaths occurring in each year. The incidence of bronchitis has been used as a criterion to test whether the years in question were favourable or not to respiratory diseases. Unfortunately the deaths from lobar pneumonia are not available for 1940-1 ; the only data available are for all forms of the disease at all ages. There has been a change in the method of classification of causes of death in these years: previous to 1940 the Registrar-General gave priority to certain causes, and now he accepts the order of death stated by the medical attendant on the certificate. The deaths for 1938 and 1939 can be ascertained by both methods, and a comparison shows that the new classification slightly increases the total of pneumonia deaths and doubles those from bronchitis. The factors for reducing the totals to the old classification are 0.9466 for pneumonia and 0.5007 for bronchitis. Applying these corrections to the years 1940 and 1941, we obtain the following:

	All Forms of Pneumonia		Bronchitis	
	Deaths	Percentage of Average of 1934–7	Deaths	Percentage of Average of 1934–7
Average 1934–7 ..	28,281	100	17,048	100
1938	25,945	92	13,273	78
1939	22,207	79	15,463	91
1940	27,636	98	23,179	136
1941	25,006	88	17,050	100

The deaths from bronchitis suggest that a particularly severe respiratory mortality was experienced in 1940. The difference between the percentage value for pneumonia and bronchitis was 12 in 1939 and 1941, but the difference of the percentages was much larger—38—in 1940. This difference of 12% might be used as an estimate of the effect of the new therapy on the mortality in 1939 and 1941, but the value for 1940—38%—would be an overstatement, since bronchitis tends to fluctuate more than pneumonia. This can be illustrated by taking the deaths for the previous 10 years and expressing them as a percentage of the mean number of deaths. The deviations then found are:

	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937
Pneumonia ..	0·4	41·9	−10·2	8·7	−4·3	−2·7	−7·3	−13·3	−8·8	−4·4
Bronchitis ..	11·0	58·1	−7·5	19·2	−3·7	−0·2	−19·7	−25·3	−16·6	−15.3

Although there has been an undoubted decrease in the mortality rate from pneumonia, an estimation of its extent is rather speculative. It seems probable that the deaths would have been 10% higher, and if we can accept this as a not too optimistic approximation then 7,500 lives were saved during 1939-41.

The deaths from lobar and other forms of pneumonia are differentiated in the returns for Scotland. The statistics for recent years in Scotland were:

	Lobar Pneumonia		Other Forms of Pneumonia		Bronchitis	
	Deaths	Percentage of Average of 1934–7	Deaths	Percentage of Average of 1934–7	Deaths	Percentage of Average of 1934–7
Average 1934–7	1,441	100	3,256	100	3,104	100
1938	1,188	82	2,644	81	2,462	79
1939	782	54	2,167	67	2,653	85
1940	873	61	3,367	103	4,317	139
1941	873	61	2,699	83	3,091	100

The experience of Scotland is very similar to that of England and Wales if the trend of the deaths from bronchitis is used as a standard of comparison of respiratory mortality. It is evident that there has been a reduction in mortality from pneumonia, with a very large decrease in lobar pneumonia. In 1940 the deaths from bronchitis were 39% above the mean value, while the deaths from lobar pneumonia were 39% below the average and the deaths from other forms of pneumonia were only 3% in excess of the mean.

The reduction in the number of deaths from pneumonia was relatively greater in Scotland than in England and Wales. The mean annual number of deaths during 1939-41, expressed as a percentage of the mean of 1934-7, was for all forms of pneumonia 88% in England and Wales and 76% in Scotland, while the values for bronchitis were almost the same—109% in England and Wales and 108% in Scotland.

Puerperal Sepsis

Puerperal sepsis forms numerically the most important component of maternal mortality. In the 10 years preceding the war 40% of the total maternal deaths were attributed to this cause. The continuity of the statistics was broken in 1940 by the adoption of a new classification: beside the modification in the method of classification, described in the paragraph on pneumonia, several causes were added to puerperal sepsis. The statistics for recent years, using the 1940 mortality classification, were:

	Total Births	Puerperal Pyrexia		Puerperal Sepsis	
		No. of Notifications	Rate per 10,000 Births	No. of Deaths	Rate per 10,000 Births
1931 ..	659,014	8,085	123	1,208	18
1932 ..	640,443	7,567	118	1,162	18
1933 ..	605,497	7,899	130	1,213	20
1934 ..	622,851	8,431	135	1,350	22
1935 ..	624,191	8,142	130	1,165	19
1936 ..	630,337	8,267	131	1,035	16
1937 ..	635,363	8,849	139	731	12
1938 ..	645,933	9,307	144	682	11
1939 ..	643,661	9,245	144	649	10
1940 ..	629,760	7,582	120	478	8
1941 ..	608,130	7,352	121	499	8

Since the number of cases of sepsis is unknown the best measure of the trend of the mortality is to relate the deaths to the births. Although the case rate cannot be found, the incidence of puerperal pyrexia suggests that the prevalence of sepsis at the beginning and that at the end of the period were similar, with possibly an increase in the intervening years. The above figures show that the mortality from puerperal sepsis has declined considerably and the rate during 1940-1 had decreased to less than a half of the value of a few years earlier.

Measles

A considerable decrease in mortality from measles has occurred during the past 20 years, but this disease differs from those previously discussed, as, although there has been steady progress in the control of measles, especially in the large towns, no sharp line can be drawn dividing the period into pre-treatment and post-treatment years. The number of deaths in England and Wales in two-year periods, to eliminate the fluctuations in the annual deaths due to the periodicity of measles, were:

Period	Deaths	Period	Deaths
1922–3	11,010	1932–3	5,348
1924–5	10,171	1934–5	5,114
1926–7	7,205	1936–7	3,802
1928–9	7,690	1938–9	1,942
1930–1	7,476	1940–1	2,129

Although the character of the attack and the severity of the accompanying complications vary from epidemic to epidemic there has been an almost progressive decline in the number of deaths. Serum prophylactics have been employed during the past decade, and special therapeutic measures—e.g., oxygen therapy—have probably influenced the trend of mortality. Other important contributing factors were the improved standards of nutrition and hygienic conditions and, in London, a greater proportion of admissions to hospital. A lowering of the virulence of the causative organism may also have had an effect. It is impossible to assess the relative importance of these various causes of the decline in mortality.

A comparison of case fatalities cannot be made, since measles has been notifiable only since the start of the war.

The population at ages 0–15 has fallen by almost one-fifth during the past 20 years, and this must be taken into account when estimating the change in mortality. If the deaths are related to the average population aged 0–15 in 1922-5 and this factor is applied to the estimated population at 0–15 in 1940-1 (obtained by extrapolating a straight line fitted to the population at 0–15 of 1935-9) the resulting expected deaths for 1940-1 would be 8,722—i.e., 6,593 in excess of those observed.

We may conclude that the sum of the various factors operating towards a decline has resulted in a reduction of childhood mortality from measles of about three-quarters of what it was 20 years ago.

REDUCTION OF OLD-STANDING DISLOCATION OF THE KNEE-JOINT

BY

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There are two main indications for attempting reduction of a long-standing dislocation of the knee-joint: first, to relieve pain; secondly, to overcome shortening as a preliminary to an arthrodesis, or excision of the joint. Forcible manipulation for such cases is usually contraindicated, and wedge plasters are obviously ineffective. The case here described was treated by the method devised by Hamilton Russell (1924) for the treatment of fractures of the shaft of the femur. This was slightly modified, skeletal traction being used instead of strapping extension.

Case Report

History.—A man aged 56 had suffered from rheumatoid arthritis "for years." He had been confined to bed for over two years and, according to his doctor, the duration of the dislocation was about 18 months. On examination the right knee was obviously dislocated. It was flexed to 140 degrees, with the leg externally rotated through 50 degrees (Fig. 1). Under an anaesthetic there were about 10 degrees of movement present.

Treatment.—The hip was placed on an adjustable Braun splint, so that traction could be exerted in the line of the deformity (Fig. 2). Skeletal traction was applied through the os calcis. This was used instead of strapping so that the

FIG. 1.—Note the clear view of the tibio-fibular joint due to the marked external rotation of the tibia.

external rotation could be controlled. A sling was passed under the knee and attached to a cord which passed over a pulley (*a*) on a Balkan beam. Thence it was continued to another pulley (*b*) on the vertical limb of the Balkan beam at the level of the leg. A third pulley was fixed to the Böhler stirrup on the os calcis nail (*c*), and a fourth (*d*) tied to the upright just below *b*. The cord was then threaded over these and finally attached to a weight of 7 lb. The foot of the bed was elevated. A cord was fixed from the outer side of the nail to a weight suspended by a pulley (*e*) on the horizontal limb of the Balkan beam to control external rotation.

Three weeks later a radiograph was taken, and it showed that the dislocation had been reduced (Fig. 3). During this

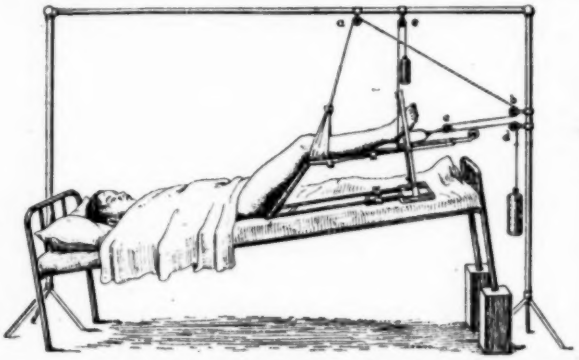

FIG. 2.—The traction under the knee pulls the head of the tibia forwards. The cord attached to the nail and passing over the pulley (*e*) helps to rectify the external rotation. The adjustable splint has been flexed to fit the contracted knee.

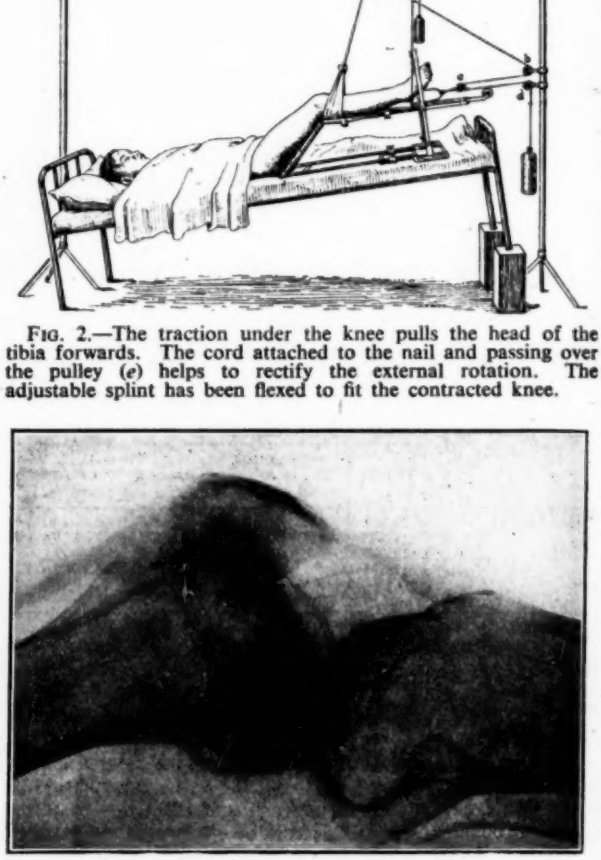

FIG. 3.—The dislocation has been reduced.

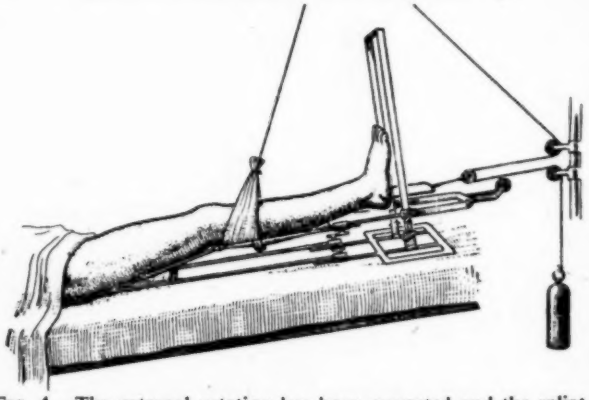

FIG. 4.—The external rotation has been corrected and the splint has been lowered so that the knee is almost straight.

time the patient did not complain of any undue discomfort. As the knee was on the adjustable type of Braun splint (Fig. 4), it was possible to lower its horizontal position and thus gradually to extend the knee. By doing this and altering the line of pull accordingly, the limb could be straightened completely. This took approximately 7 weeks.

Summary

A simple method of reducing an old dislocation of the knee-joint is described. The ease with which the reduction was achieved makes it possible that this case was exceptional; but the simplicity of the manœuvre would seem to warrant a trial in such cases.

BIBLIOGRAPHY

FitzGerald, F. P. (1940). *Lancet*, **2**, 440.
Russell, R. Hamilton (1924). *Brit. J. Surg.*, **11**, 491.

Medical Memoranda

A Pencil in the Urinary Bladder

There are many accounts in the literature of an endless variety of foreign bodies in the urinary bladder, but I could not find another exactly comparable to the present case, and it therefore seems worth placing on record.

Case History

A married man aged 28 was admitted to hospital complaining that he had a pencil in his bladder. He was accompanied by his doctor, who gave the history that the patient had introduced the foreign body the previous night.

On examination he was seen to be a well-developed man. His temperature was 98.6°, pulse 80, and respirations 20. He had only slight pain. He was able to pass water, but micturition was accompanied by pain, especially at the end of the act. On occasion there was obvious blood in the urine. The frequency of micturition was every 4 to 5 hours during the day and night. The stream was only a little impaired. The bladder was not distended. The end of the pencil was palpable in the perineum, projecting from the region of the bulb of the urethra and lying close under the skin. There was no extravasation of urine. By deep palpation above the symphysis pubis the pencil could be felt bimanually and movement conveyed to its extremity. There was no discharge of blood from the urethral orifice, but the latter showed signs of having been stretched, probably on a number of previous occasions. A radiograph (Fig. 1) showed the pencil lying vertically in the

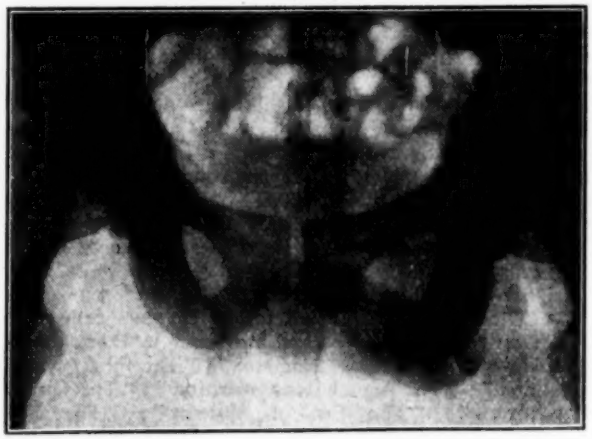

Fig. 1.—Radiograph showing position of the foreign body.

pelvis behind the symphysis pubis and projecting into the perineum.

Cystoscopy was performed under general anaesthesia. The cystoscope on reaching the bulb of the urethra touched the pencil but slipped through the prostatic urethra alongside the foreign body without any difficulty. A good view of the pencil was obtained, and the inscription on it could be clearly seen; there was a moderate cystitis. Suprapubic cystotomy was then performed. On opening the bladder the pencil was found to be lying vertically. Its unsharpened end was impacted in the mucosa of the fundus of the bladder, producing a small round ulcer but not penetrating the muscular coat. The distal end of the pencil lay in the prostatic urethra; the point penetrated the urethra in the region of the bulb and projected into the

Fig. 2.—The foreign body.

tissues of the perineum. The pencil was easily removed by disimpacting the proximal end and withdrawing the distal end from the urethra. It measured 6½ in. in length (Fig. 2). The bladder was closed with suprapubic drainage.

The post-operative course was uneventful, the patient passing some urine naturally on the ninth day. At this time the suprapubic catheter began to leak, and was replaced by a Hamilton Irving box. The wound closed rapidly: at the end of 3 weeks it was dry and the patient up and about. He passed urine naturally, and at no time was there trouble in the perineum caused by the wound of the floor of the urethra.

Comment

On questioning the patient after operation he confessed that he had passed the pencil into his urethra many times, but that on this occasion it slipped out of reach and into the bladder without any great difficulty or pain. It is remarkable that an article of this length could so easily negotiate the natural curve of the urethra. True, the urethra had been dilated by previous attempts, and this was confirmed by the condition of the external urinary meatus and by the fact that the urethra could accommodate the foreign body and a cystoscope without difficulty. Presumably the point of the pencil was made to perforate the floor of the urethra by muscular contractions of the bladder during micturition.

My thanks are due to Dr. Gubbin, medical superintendent of the emergency hospital in which this patient was treated, for permission to publish this case; to Dr. Fraser for the radiograph; to Dr. Winternitz, my house-surgeon, for assistance in the treatment of this patient; and to Miss Lewis for the photograph.

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Bibliography

Brodie, Desborough (1937). *Lancet*, **1**, 266.
Charles, A. H. (1939). *British Medical Journal*, **2**, 224.
Cook, James (1935). *Lancet*, **2**, 1232.
Fenger, E. P. K., Petter, C. K., and Thomas, G. J. (1929). *Minnesota Med.* **12**, 378.
Grant, Owsley (1936). *J. Amer. med. Ass.*, **107**, 1632.
Levy, M. L. (1928). Ibid., **90**, 115.
Nitschke, Paul H. (1938). *Amer. J. Surg.*, **40**, 560.
Shih, H. E. (1938). *Chin. med. J.*, **54**, 223.
White, H. P. Winsbury (1930). *Brit. J. Urol.*, **2**, 27.

Cheese Itch: Contact Dermatitis due to Mite-infested Cheese Dust

We would like to draw attention to a form of dermatitis affecting persons handling cheeses the surface of which has become infested with mites of the Tyroglyphus family.

Some months ago three such cases were seen among two separate gangs of workers who were unloading imported cheeses at the dockside. While manipulating the crates they became showered with a fine brown powdery dust which thickly coated the cheeses; some hours later an acute irritable erythematous dermatitis developed over their faces, necks, and flexor wrist areas. They stated that all the other men who came in close contact with the dust were also affected, though less severely. Samples of the dust were found microscopically to be teeming with mites which were subsequently identified by Mr. E. Browning, Department of Zoology, British Museum (Natural History), as *Tyroglyphus longior* var. *Castellanii*, Hirst, the mite which is responsible for eruptions in handlers of dried coconut kernel (copra itch). An account of these cases will be published shortly in the *British Journal of Dermatology*.

Just recently another group of cases has occurred at a provision depot among girls handling cheeses that had been stored for a considerable time. The dermatitis was of the same acute diffuse erythematous type and involved the same areas. A specimen of the cheese dust showed a heavy infestation of active Tyroglyphid mites with numerous ova and dead bodies.

It is noteworthy that, except for a few small urticarial lesions on the forearms in one patient, the eruption in no case suggested a parasitic cause, but was characteristic of dermatitis due to an irritant. Moreover, as all who were exposed to the dust seem to have been affected, it would appear that the mites must generate an irritant of considerable potency.

The dermatitis has subsided quickly, though in one case scaling of the eyelids persisted for over a fortnight.

Tyroglyphidae are of world-wide distribution and, apart from cheese, may attack foodstuffs of many kinds, such as flour, grain, sugar, dried meats and fruits, and jams. They may therefore present a problem not only as a cause of occupational dermatitis but as destroyers of stored foods, which is of added importance during wartime. In the case of cheese they live mainly in the rind and appear to cause little or no material damage to the cheese itself. They are not, of course, related in any way to cheese maggots, which bore into the cheese itself and are the larvae of a fly, *Piophila casei*.

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Reviews

CYTOLOGY

Cytology and Cell Physiology. Edited by Geoffrey Bourne. (Pp. 296. 20s.) Oxford: The Clarendon Press.

It is to be hoped that the title of this book will not restrict its readers to cytologists. It contains a whole range of information on aspects of the subject on which attention is most focused now. This means that it provides both the outlook and the facts which are so essential to every biologist.

Knowledge of the morphology of the cell has not made any great advance recently, although much can probably be expected of new techniques such as micro-incineration and the electron microscope. But many facts of great interest have been found concerning the changes in structure in different physiological and pathological conditions. Knowledge of them would resolve many of the mysteries that worry those to whom cytology has until now appeared as an art of artefacts. Neurophysiologists have learnt to think of the mechanism of the nervous system in terms of the action of its component cells and the properties of their membranes. Others, such as biochemists, pharmacologists, and pathologists, will have to think more and more in terms, not of organs and tissue slices, but of cells and intracellular systems. It must not be thought that the debt will be one-sided. The cytologist owes much to a wide range of sciences. Physical chemistry has helped in the study of cell membranes; biochemistry has suggested methods for identifying enzymes within the cell; genetics has led to advance in the knowledge of the nucleus.

The standard of the work of the different contributors is uniformly high despite the difficult conditions under which they were working. Indeed it is just those chapters which appear to have been written in the absence of easy access to reference libraries that would be most readable and instructive for those whose interest in the subject is greater than their knowledge of it. The only criticism of the book that can be offered is that the system of references is very awkward to use. The publishers are to be congratulated on a production which is entirely of pre-war standard.

HISTORY OF MEDICAL PSYCHOLOGY

A History of Medical Psychology. By Gregory Zilboorg, M.D., in collaboration with George W. Henry, M.D. (Pp. 606; 19 illustrations. $5.00 or 28s.) New York: W. W. Norton and Company Inc.; London: George Allen and Unwin.

This handsomely produced book is a successful attempt to trace the development of beliefs, facts, and theories about the human mind in health and disease. Dr. Zilboorg contributes the first 12 chapters, and Dr. Henry the last two, on "Organic Mental Illnesses" and "Mental Hospitals." Among the illustrations is an unusual one of Freud.

For centuries psychology was the province of the philosopher and theologian, and was neglected by medical men; a history of medical psychology must therefore, Dr. Zilboorg remarks, be approached in a way "entirely different from that required by the history of medicine and surgery." For all that, he sticks fairly closely to the story of medicine, and it would not be unfair to describe his book as a history of medicine as seen through the eyes of a psychologist.

Hippocrates observed of epilepsy that it appeared to him "to be in no way more divine, nor more sacred than other diseases, but has a natural cause from which it originates like other affections"; and that "they who first referred this disease to the gods appear to me to have been just such persons as the conjurors, purificators, mountebanks, and charlatans now are." Hippocrates gave a rational classification of mental diseases, and looked upon the brain as the centre of reason, to be displaced later by Aristotle to the heart. To Hippocrates the action of the four humours on the brain was an important determinant of mental disorder. The clear-headed view of Hippocrates—that mental disease was the result of natural causes—was not followed by Plato, who said there were two kinds of mania, one due to disease, the other "a gift of the gods." So back again came the idea of the divine origin of mental disorder. Although Aristotle believed that the "souls" of man acted as a unit, he considered that reason was independent of man or matter, and that it could not be attacked by illness because it was immaterial and immortal. This view, Dr. Zilboorg states, played a decisive part in the history of psychiatry, because it "naturally must reject the very existence of purely psychological troubles."

In the second and first centuries B.C. gleams of clear light in the history of medical psychology illumine vividly the darkness into which men were to descend centuries later. Asclepiades, it appears, realized that mental disease could be due to emotional disturbances: he prescribed baths, "musical harmony and a concert of voices" for his patients; and condemned the practice of keeping the mentally sick in cells and dungeons.

Dr. Zilboorg gives some remarkably interesting quotations from Cicero, worth reproducing here: "Man being composed of body and soul," Cicero writes, "why is it that so much attention has been paid to the art of the preservation of the body and the curing of bodily ills; why is it that this art, which because of its usefulness was attributed to the power of the gods, has so badly neglected the development of the art of healing the soul?" "Is it," Cicero asks, "that the ailments of the soul are less injurious than physical ailments, or is it that physical ailments admit of treatment while there is no means of curing souls? But diseases of the soul are both more dangerous and more numerous than those of the body."

Living in the first century of our era, and practising in Alexandria and Rome, Soranus of Ephesus was notable for his insight into mental conditions and his humane approach to treatment. He condemns the use of force and the excessive employment of drugs and purgatives. "Much tact and discretion," he said of mental patients, "should be employed in directing attention to their faults; sometimes misbehaviour should be overlooked or met with indulgence." "Maniacs must be placed in a moderately lighted room, which is of moderate temperature and where the tranquillity is not disturbed by any noise. . . . Their beds should be solidly fastened and placed in such a manner that they do not see persons who enter; a variety of irritations is thus avoided." (Soranus, it may be recalled, advocated blocking the mouth of the uterus with cotton or ointments to prevent conception.) And so we come to Galen (A.D. 129–200), of whom Prof. Major Greenwood says, ". . . It is *only* the psychological aspects of his teaching which have survived the collapse of Galenism as a medical system."

The above is a brief summary of the first four chapters of Dr. Zilboorg's book. Then follow chapters called, "The Great Decline"; "The Ruthless Surrender to Demonology"; "The Blows of the Witches' Hammer"; "The First Psychiatric Revolution"; "The Age of Reconstruction"; "The Discovery of Neuroses"; "The Era of Systems"; "The Second Psychiatric Revolution"; "Epilogue." Dr. Zilboorg naturally gives a lot of space to Freud, but his treatment of Adler and of Jung, especially the latter, is too summary. It is odd that both Roger and Francis Bacon are not separated in the index, sharing the one entry, "Bacon." Dr. Zilboorg's style is undistinguished, and might well have been more terse. For his industry in compiling a book packed with so much interest, medical men devoted to the history of their profession will be much indebted.

DIRECTORY FOR THE DISABLED

Disabled? Inquire Within. Central Council for the Care of Cripples. 34, Eccleston Square, London, S.W.1.

This useful booklet has been produced with the object of assisting citizens' advice bureaux, hospital almoners, and social workers whose duty it is to direct disabled persons to sources of appropriate help. Whether disablement is the result of crippling disease, or of injury sustained in war service, in air raids, or in industrial accidents, there is now a large network of provision covering the country—though some areas are better provided than others—which it is very useful to have catalogued.

The booklet first describes the statutory services which are available, principally through the Ministries of Health, Labour, and Pensions, and then gives a list of the voluntary agencies and their particular functions. The Central Council for the Care of Cripples itself is a co-ordinating agency for all organiza-

tions working for the welfare of cripples. There are also the After-Care Association, the Invalid Children's Association, the Royal Surgical Aid Society, the British Legion, and various organizations for Service people. Then a brief description is given of the means of treatment, education, and after-care available to the physically defective child and the services for the physically disabled adult, including the orthopaedic sections of Service hospitals and the arrangements for dealing with air-raid casualties, industrial workers, and civilian disabled in general.

The impression obtained from this booklet is of an abundant provision, though it needs to be set over against the vast—indeed the appalling—extent of crippledom of one sort or another. The Ministry of Health has lately established under the Emergency Hospital Scheme seven orthopaedic centres in the London sectors and eleven in other regions of England and Wales. But there is only one in Yorkshire and only one in Northumberland and Durham. Fracture departments have been set up by the Ministry—56 of them for long-stay cases and over 200 for ambulatory and short-stay—but in Yorkshire and Northumberland and Durham there are only five of the former compared with twenty in the London sectors. Particulars are also given of the various Government and other schemes for the training and resettlement of disabled persons, including the arrangements for occupational therapy set up in E.M.S. and other hospitals and for vocational training under the Ministry of Labour's scheme. This booklet will be of service to many medical practitioners, especially in industrial areas.

Notes on Books

A Bibliography of Aviation Medicine, by EBBE CURTIS HOFF and JOHN FARQUHAR FULTON, is published in London by Baillière, Tindall and Cox at 22s. This is an amazingly complete and up-to-date collection of over 5,000 references. It contains little explanatory subject-matter, for the clear indexing and tabulation are self-sufficient. The articles are listed under subject headings with detailed subheadings, and there are also alphabetical indices of authors and subjects. Several smaller bibliographies of aviation medicine have appeared before, but the present large volume prepared for the Committee of Aviation Medicine of the National Research Council of America will supersede all others and will be invaluable to that rapidly growing army of research workers who are helping the flying man to meet the increasing demands made by his machine.

The thirteenth edition of *Pye's Surgical Handicraft* is the third since Mr. HAMILTON BAILEY took this work in hand. Destroyed by enemy bombing while in preparation, with the loss of the illustration blocks and a large number of the original illustrations, this edition was again bombed when just about to be published. Its birth therefore has been a difficult one, for the ultimate success of which both authors and publishers are to be congratulated. Several of the forty contributors are now serving as members of H.M. Forces. The useful and practical features of this book are too well known to require further comment. The tribute paid to Walter Pye, the original editor who died in 1892, could be enhanced by a few words as to who he was, what his appointments were, and the nature of his work, while it would add to readers' interest to know who the intervening editors have been. What from the vicissitudes attending its production appeared to be an unlucky thirteenth edition may well prove to be the most popular and most successful printing which this well-known book has yet had. It is published by John Wright and Sons, Ltd., at 25s.

Beaumont's classical observations and experiments on Alexis St. Martin really provided the basis for the modern study of gastric digestion. Indeed he noted points which remained neglected for many years and in which interest was only revived in the 20th century, such as the regurgitation of bile and the psychical factor in gastric secretion. Dr. GEORGE ROSEN gives an interesting account of *The Reception of William Beaumont's Discovery in Europe* (Schuman's, 20, East 70th Street, New York; $5.00). In this he shows that Germany first realized its significance, and England soon after. Its recognition in the United States, its home of origin, came decidedly later. The introduction of the stomach tube by Kussmaul in 1867 completely diverted interest from Beaumont's work until the time of Pavlov. The book is well documented and well produced, but we hesitate to recommend the expenditure of a sovereign for its 86 pages at the present time.

The report prepared by "Mass Observation" for the Advertising Service Guild entitled *People in Production* was noticed on its first appearance in a leading article in our issue of May 16, 1942, under the heading "Morale on the Home Front." This interesting document on British war production has now been reissued as a Penguin Special of 280 pages at the low price of 9d.

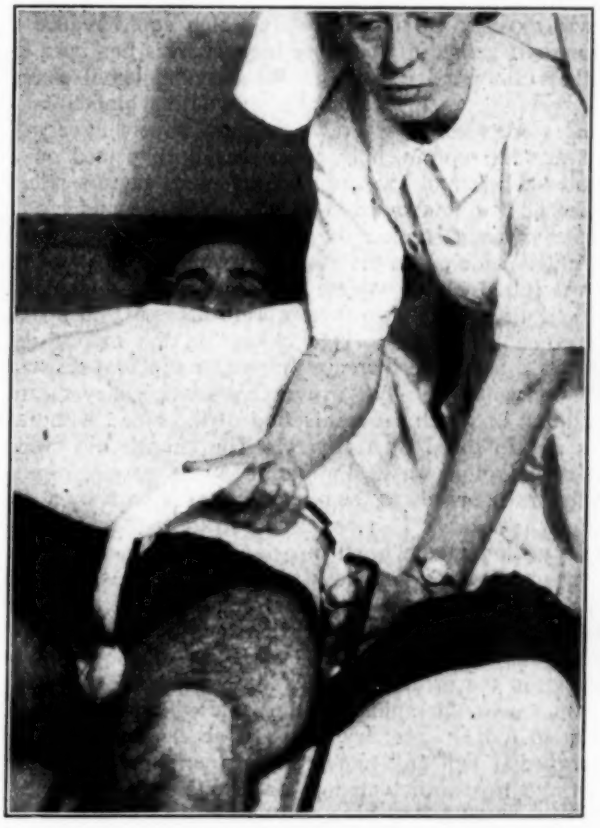
Preparations and Appliances

A MODIFICATION OF THE THOMAS SPLINT

Dr. M. P. LAUFER writes from the County Hospital, Keighley:

To apply a Thomas splint to a seriously injured limb is often a very difficult matter. The main difficulty consists in the sliding of the ring up the whole length of the injured limb without pain, discomfort, or displacement.

The modified Thomas splint, as here portrayed, dispenses with all the difficulties attached to the application of the ordinary splint. Its advantages are easily enumerated: (1) There is no need to slide the ring up the limb; it is put around



it. (2) The handling of the injured limb is reduced to a minimum. (3) The danger of increasing shock and displacement is lessened. (4) The number of helpers is substantially reduced. (5) The hinge is 1¼ in. away from the joint formed by the internal bar and the ring; it is just outside the part of the ring which represents the effective area essential for the immobilization of the limb. (6) The "lock" is simple and secure; it is opened and locked by pulling the movable part of the ring in axial direction; the "spring" action of the halved ring makes it possible. (7) The lock is outside the pressure area. (8) Last but not least, the modification is easily made on any Thomas splint with a minimum of cost.

The photograph shows the locking of the ring. At this stage the areas of hinge and lock may be padded. The line drawing gives details of the "lock."

First-aid teams who have not the benefit of an anaesthetist's help to effect painless application of the ordinary Thomas splint to a severely injured limb will be the first to profit by the modification.

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SOME ASPECTS OF SHOCK THERAPY

The gradual deterioration of the clinical condition which occurs in some cases of tissue trauma or severe haemorrhage in spite of repeated transfusions of blood or blood substitutes is only too painfully familiar. It is believed that this failure of transfusion therapy is due in large measure to a breakdown in the mechanisms involved in maintaining an adequate volume of blood. Various explanations have been given of the causes of failure, but none of them has been satisfactory. They have been concerned mostly with those factors which could reduce the amount of actively circulating blood. This has been due to the widespread belief that the essential lethal element is a reduction in the volume of circulating blood.

In recent months several significant papers have made it clear that too much emphasis has been placed on the blood volume and too little on the other factors relating to the heart and the blood vessels. Wiggers and his colleagues[1 2] have studied the effects of the withdrawal of quantities of blood equal to approximately 40% to 50% of the initial blood volume in anaesthetized dogs. They showed clearly that two factors were necessary to produce "irreversible shock": (1) a change in the myocardium, and (2) a failure to increase the total peripheral resistance in the circulation. By "irreversible shock" they meant a condition in which the reinjection of the blood withdrawn was not followed by recovery. The change observed in the myocardium was a diminution of the normal response of the heart muscle to the stretch imposed on it by a given venous pressure. This change was due to impairment of the nutrition of the heart muscle as a result of a reduced coronary flow from a low arterial pressure. The other finding that the total peripheral resistance of the circulation was never maximal in their experiments suggests that there was some degree of depression of the vasomotor centres in the medulla. The failure to increase peripheral resistance would rapidly yield a state of hypotension sufficient to reduce coronary flow and accelerate the onset of myocardial damage. In Wiggers's experiments it was found that the myocardial change occurred in the presence of an adequate blood volume and was independent of haemoconcentration and haemodilution. If it be considered that the precipitating factor was the persistent hypotension, this might have been due to the action of the anaesthetic on those centres which would normally act to restore arterial pressure. This view receives support from the work of Fine *et al.*,[3] who noted that, while haemorrhages up to 40% of the blood volume did not cause a persistent hypotension in unanaesthetized animals, the same amount of haemorrhage caused permanent hypotension in animals anaesthetized with nembutal. It is significant that both groups of workers used barbiturate anaesthetics, which are known to depress the hypothalamic and medullary cardiac and vasomotor centres.

Dr. Lena Stern, in an article in our present issue (p. 538), has introduced a new treatment of shock which depends on a method of stimulating these cardiovascular centres directly. Without knowledge of the work of Wiggers and of Fine she has focused her attention on the condition of the vegetative nervous system and concluded that there is a reduction in the activity of the sympathetic system simultaneously with an increased stimulation of the parasympathetic. On the basis of her work on the potassium-calcium balance in the cerebrospinal fluid (c.s.f.) she decided to attempt to raise the potassium content of the intraventricular c.s.f. and in this way to increase the activity of the sympathetic while inhibiting the parasympathetic by a direct effect of potassium ions on the ganglion cells. Without increasing the blood volume by transfusion, Dr. Lena Stern observed that intraventricular injections of a potassium salt immediately raised the blood pressure and apparently brought the animal out of shock. These findings have been applied successfully to the treatment of war casualties.

Unfortunately, no details of the types of case treated are given, and so one cannot evaluate the new method of treatment. That it should fit in with the papers referred to above is a happy and timely coincidence. One point may be discussed further. Dr. Stern considers a state of parasympathetic hyperactivity to exist with depression of the sympathetic centres. The observation of Wiggers *et al.*[1] that the myocardial defect was a lack of response to stretch suggests that this defect may be attributable in part to vagal overactivity—first, by diminishing the calibre of the coronary vessels, and, secondly, by releasing potassium ions, which act directly on heart muscle. Winkler *et al.*[4] in 1938 showed that only a small increase in blood potassium was necessary to cause obvious electrocardiographic changes, and these were due to effects on the myocardium. When the potassium concentration was gradually raised there was cardiac failure in diastole with the dilated heart observed in cases of experimental shock from trauma or haemorrhage. In the cardiac failure that finally takes place potassium may well be the lethal agent. Scudder,[5] in 1940, stressed the part played by potassium poisoning in shock and suggested the use of adrenal cortical hormone as a remedy. Unfortunately, expectations have not been realized. The reasons for the partial failure have been studied by Fine *et al.* They showed clearly that cortin alone is ineffective in treatment of shock, but when saline solutions are given intravenously with cortin there is in some animals a rise in arterial tension which tends to be maintained. Desoxycorticosterone acetate is ineffective either alone or with saline infusions. It would seem, therefore, that with the present evidence treatment should be aimed at increasing peripheral resistance and not at eliminating excess potassium from the myocardium. Given an efficient coronary flow by relaxation of coronary vessels and increased arterial tension, any potassium excess in the myocardium would be speedily dissipated.

Although there are many gaps yet in the evidence, it is clear that Dr. Stern has come forward at the right moment and has reoriented our views on the treatment of shock. That does not mean, however, that transfusions will cease to be used. Her work will need confirmation; and, granted that confirmation is forthcoming, it would appear that Dr. Stern's treatment should be reserved for those patients who do not show progressive increases in arterial tension as transfusions are given. Whitby and his colleagues[6] have made it clear that the gradual stepping up of the arterial tension with successive transfusions is the best prognostic feature in treatment of haemorrhage and shock from injury.

1 *Amer. J. Physiol.*, 1942, **138**, 401.
2 Ibid., p. 421.
3 *Surgery*, 1942, **12**, 1.
4 *Amer. J. Physiol.*, 1938, **124**, 478.
5 *Shock*, J. P. Lippincott Company, 1940.
6 *Lancet*, 1941, **1**, 99.

FOETAL AND POST-NATAL CIRCULATION

The solution of the various problems which are encountered in the study of the foetal and post-natal circulation of the blood has attracted the attention of scientific workers since the times of Galen, who first described the foramen ovale, and who has himself been described as the "founder of modern physiology." He was succeeded in the seventeenth century by Harvey, Lower, and others. More recently the early embryonic stages in the development of the heart and vascular system have been studied by means of serial sections and reconstruction models by His, Born, Tandler, Prentiss, and many others. The work accomplished by these pioneer investigators, and the inferences made by them, have now in large measure been confirmed and have received a new impetus from records demonstrating the actual course of the circulating blood currents obtained by modern methods of technique, which at the suggestion of Sir Joseph Barcroft and Dr. H. Barron have been utilized and adapted for the study of the foetal circulation by Dr. A. E. Barclay, Dr. K. J. Franklin, and Mr. M. M. L. Prichard.[1] These workers have employed direct and indirect *x*-ray cinematography, combined with intravascular injection of radio-opaque media, in the investigation of the time and manner of closure of the ductus arteriosus, the closure of the foramen ovale, and the intracardiac flow of blood reaching the heart through the superior and inferior venae cavae, and also the circulation of blood reaching the foetus by the umbilical vein through the liver and ductus venosus. This work, which has been carried out at the Nuffield Institute for Medical Research, Oxford, has been extended, and was also preceded by other experimental work on the foetal circulation, including that in the pulmonary vessels; this has been supplemented by a valuable historical record of the literature and studies in comparative anatomy and embryology contributed by Dr. E. C. Amoroso of the Royal Veterinary College, London, Dr. K. J. Franklin, and others.

It will not be possible in this short article to do more than give a brief summary of some of the more important results that these authors have been able to demonstrate in living eutherian foetuses (principally sheep) delivered by Caesarean section and photographed while the foetus was still in connexion with the uterus by means of the placenta and vessels of the umbilical cord. In these operations a radio-opaque material was injected into one of the foetal veins (external jugular, femoral, or umbilical) and respiration prevented, so as to disturb the conditions of intra-uterine life as little as possible. Perhaps the most striking results which have been demonstrated by these means are: (1) The division of the inferior or posterior vena-caval flow into two streams, (*a*) a larger passing through the foramen ovale into the left atrium, and (*b*) a smaller which enters the right ventricle through the right atrio-ventricular or tricuspid orifice. (2) The flow of the whole of the superior or anterior vena-caval blood through the right atrium and right ventricle into the pulmonary trunk, and by the ductus arteriosus into the descending aorta and pulmonary arteries. (3) The flow from the placenta via the umbilical vein to the inferior vena cava; a small portion only of this blood is by-passed through the ductus venosus, and enters the inferior vena cava directly; the larger portion traverses the liver substance through branches of the umbilical vein, which carry the blood to the hepatic sinuses and so to the large hepatic veins which open into the posterior vena cava. (4) Lateral radiographs of the circulation through the heart of a foetal lamb have also been obtained which show the influence of the tubercle of Lower—well developed in the sheep—in directing the anterior vena-caval inflow, and thus preventing a mixture of this current with that which passes from the posterior vena cava through the foramen ovale.

The division of the posterior vena-caval inflow into two divisions was inferred in 1776 by C. F. Wolff, who estimated that "towards full term about two-thirds of the inferior vena-caval blood would take the left-hand route and about one-third the right-hand one." Wolff's work did not become generally known, but was confirmed by Ziegenspeck in 1905 in guinea-pig and human hearts. Ziegenspeck made drawings of the relation which the caudal, lower edge of the interatrial septum has to the posterior vena-caval channel, as seen when looking at it from below, through a transversely divided posterior vena cava in an excised foetal heart. The actual division of the inflowing blood from the posterior vena cava in the circulating blood stream of the living foetus has, however, been demonstrated for the first time by the writers whose work we are considering, as well as other records of the circulation in the intact foetus.

From the physiological point of view, and owing to variations which are met with in different types of animals rendering inappropriate certain terms that are now used in human anatomy, the authors have found it necessary to introduce some new names. Thus the projecting ridge which divides the posterior vena-caval channel into right and left terminal divisions is named the *crista dividens*, and the boundaries of the foramen ovale are described as (*a*) *a fixed portion*, consisting of the curved lower edge of the upper part of the annulus ovalis (septum II), and (*b*) an *apposable portion*, the valve of the foramen ovale or upper free portion of the septum primum, which overlaps the fixed portion, or "crista dividens," on its left side.

[1] See *J. Anat.*, London, 1941, **76**, 100; 1942, **76**, 240. *Brit. J. Radiol.*, 1938, **11**, 570; 1939, **12**, 505; 1940, **13**, 227. *Vet. J.*, 1942, **98**, 29.

IMMUNIZATION AGAINST INFLUENZA

Early and inconclusive attempts to immunize against influenza with virus vaccines have been followed up in the United States, and several prolonged and painstaking studies have now been reported. The problem is far more complex than it originally appeared, for it is now known that at least two distinct viruses are concerned, and other indistinguishable cases occur in which the causal agent is unknown. The virus originally isolated by Andrewes, Laidlaw, and Wilson Smith is designated virus A; the unrelated virus B was identified by Francis two years ago; and influenza from which neither of these can be recovered is known as influenza Y. That the first two are immunologically quite distinct is confirmed by the observations of E. R. Rickard, F. L. Horsfall, G. K. Hirst, and E. H. Lennette[1] on the relation between the antibody content of the blood and susceptibility to influenza. Whereas a high antibody level is correlated with immunity to the corresponding virus, susceptibility to the other is unaffected. They make a further deduction which is quite unexpected and somewhat disturbing—that the higher the degree of immunity to either of the known viruses, the greater is susceptibility to influenza Y. This conclusion seems to suggest that a factor apart from humoral immunity must take part in determining susceptibility to influenza. The same workers[2] describe a clinical experiment on a large scale in which some of the inmates in a number of State institutions were inoculated with a formalinized vaccine of virus A and canine distemper virus.

[1] *Publ. Hlth. Rep.*, Wash., 1941, **56**, 1819.
[2] Ibid., p. 1863.

The effect on serum antibody to virus A was determined by neutralization and complement-fixation tests, and the aetiology of subsequent cases of influenza was verified in the same way. Their conclusion is that the incidence of influenza A was significantly reduced. On the other hand, M. Siegel, R. S. Muckenfuss, M. Schaeffer, H. L. Wilcox, and Ann G. Lieder,[3] in a study carried on over four years in a large institution for mental defectives, and employing similar vaccines, reach the discouraging conclusion that immunization had no effect in reducing the frequency of influenza, whether due to virus A or to other organisms. This is not only a prolonged but a detailed and thorough study, and its circumstances—confinement to a single large institution with patients under complete control, and the alphabetical separation of inoculated and control cases—entitle it to serious consideration. Several incidental observations made are not encouraging, and perhaps the least hopeful feature of the whole subject is the evidently transient nature of immunity, however produced. Not only does the antibody titre decline demonstrably within a few months of vaccination, but in several cases repeated attacks of influenza due to virus A were observed, indicating that the infection itself does not necessarily confer a lasting immunity. If this is generally true of the natural disease, what can be expected of any method of artificial immunization? In all these studies the vaccine contained inactivated virus; living virus was employed in earlier American studies, and it is of interest in this connexion that F. M. Burnet,[4] who has succeeded by intratracheal injection in producing influenza A in *Macacus cynomolgus* (*M. irus*), found vaccination in this animal by the subcutaneous route to be effective only when living virus was used. Taking this evidence as a whole, it cannot be said the influenza virus vaccines now available have much claim to be regarded as satisfactory immunizing agents. All this takes no account of the common cold, in which other viruses are believed to be concerned. An altogether new approach to this problem seems necessary if any real progress is to be made.

EPILEPTOGENIC PROPERTY OF SULPHATHIAZOLE

The local application of the sulphonamide drugs to wounds has recently been employed to a considerable extent. In this use sulphathiazole has been found in many respects unsatisfactory, and it is now apparent that, applied to the cerebral surface, it is apt to be particularly dangerous. Watt and Alexander[5] report 10 cases in which craniotomy was performed and sulphathiazole applied to the wound intradurally or extradurally after suture of the dura, as a prophylactic against operative infection. In 6 cases the craniotomy was frontal; in 5 of these the dura was opened (in one case merely punctured for ventricular tapping), and all 5 developed early post-operative epileptic attacks, often with focal features. The attacks generally ceased within a few hours, but 2 of the patients passed into status epilepticus and died. In the remaining frontal case the thickened dura was not opened, and it presumably provided an effective barrier against diffusion of the drug in solution towards the underlying brain. The remaining 4 cases of the series were spared the epileptic complication, and in these the craniotomy was lateral or posterior in position; the dura was widely opened. It is interesting that in one case of this group there was focal epilepsy as a leading pre-operative symptom, yet there was no post-operative complication; in contrast, all the affected cases had no previous history of epilepsy. The authors, in animal tests, found that in 9 out of 10 experiments sulphathiazole applied to the cerebral surface is a powerful epileptogen. This property was found not to be related to sterilization of the powder or to the source of manufacture. Their experiments also confirmed the clinical experience that sulphapyridine is not an epileptogenic substance, and sulphadiazine and sulphacetamide were found to be innocuous. Simultaneously and independently Pilcher, Angelucci, and Meacham were working on a similar experimental investigation in a larger series of animals. In a preliminary report[6] they also sound a warning against the use of sulphathiazole intracranially. In a high percentage of their experiments the application of sulphathiazole to the surface of the brain was followed by epilepsy with focal characteristics. The concentration of the drug in the blood and the cerebrospinal fluid remained at a low figure.

These observations, when followed up, may perhaps throw some light on the causation of epilepsy. But the important practical point that emerges is that sulphathiazole may not be used with impunity in proximity to the brain. It is also apparent that other chemotherapeutic substances, as they become available in the future, must be fully tested experimentally before they can be employed clinically.

EGG-WHITE INJURY IN MAN

Last year (Oct. 11, 1941) it was noted in this *Journal*[7] that it had not yet been shown that biotin, vitamin H, or co-enzyme R (probably all the same substance) was necessary for man. This year Sydenstricker and his colleagues[8] have reported certain symptoms in four patients (three white men and one negro woman) who volunteered to eat a diet free from biotin and rich in egg-white. The diet consisted of a mixture of 125 g. rice, 80 g. white flour, 75 g. farina, 205 g. cane sugar, 32 g. lard, 10 g. washed butter, 25 g. lean beef, and 200 g. dehydrated egg-white. This represented 387 g. carbohydrate, 31 g. protein other than egg-white, and 32 g. fat, with a total caloric value of 1,960 daily. In addition 928 calories were derived from the 160 g. protein and 32 g. fat in the egg-white, making a total daily caloric intake of 2,888. This diet was poor in all vitamins except riboflavin, which was present to the amount of 10 mg. per 100 g. of egg-white. The following supplements were therefore given daily: thiamine hydrochloride 6 mg., riboflavin 9 mg., nicotinic acid 75 mg., pyridoxine 5 mg., calcium pantothenate 5 mg., ascorbic acid 75 mg., vitamin A 5,000 units, ferrous sulphate 1 g., and calcium lactate 1 g.

At the beginning of the experiment all the subjects were in good general condition and free from symptoms and signs of avitaminosis. During the third and fourth weeks all developed a fine scaly dermatitis which did not itch and which disappeared spontaneously. In the seventh week one patient came out with a maculosquamous dermatitis of the hands, arms, and legs. During the seventh and eighth weeks all showed a greyish pallor of the skin, which, being out of proportion to the blood picture, was interpreted as evidence of peripheral vasoconstriction. The three white patients showed definite atrophy of the lingual papillae, patchy with the production of a "geographic" tongue in one, general in another, and on the lateral thirds of the tongue in the third. The negro woman's tongue was not affected until the fourteenth week. None of them showed the capillary engorgement seen in pellagra or ariboflavinosis. Dryness of the skin of the extremities with well-defined reticulation and a

[3] *Amer. J. publ. Hlth.*, 1942, **38**, 55, 186.
[4] *Austral. J. exp. Biol. med. Sci.*, 1941, **19**, 281.
[5] *Lancet*, 1942, **1**, 493.
[6] *J. Amer. med. Ass.*, 1942, **119**, 927.
[7] *British Medical Journal*, 1941, **2**, 518.
[8] *J. Amer. med. Ass.*, 1942, **118**, 1199.

tendency to fine branny desquamation developed again in the ninth and tenth weeks. No ocular or genital lesions were observed. After the fifth week many of the symptoms associated with vitamin B_1 deficiency began to appear—e.g., mild depression to extreme lassitude, muscle pains, hyperaesthesia, and anorexia. There was a diminution in the haemoglobin content of the blood, the number of erythrocytes, and the volume of packed red cells, in spite of a theoretically adequate intake of iron and protein. The daily excretion of biotin fell from the 29–62 μg. of persons taking a normal diet to 3.5–7.3 μg. When a biotin concentrate was injected (75–300 μg. daily), depression, muscle pain, precordial distress, and anorexia were abolished on the third to fifth day of treatment. The ashy pallor disappeared in four days. The urinary excretion of biotin rose to 55 μg. and later, with a larger intake, to 150 μg. per day. When medication ceased it fell to a level slightly below that of patients eating a normal diet. Thus the experiment seems to afford clear evidence that biotin is essential to the nutrition of man.

GASTRIC SECRETION AND ULCER

Peptic ulcer arises only in those parts of the digestive tract exposed to the action of acid gastric juice, and all experimental and clinical research seems to prove that both acid and pepsin must be present if ulceration is to occur. Exactly how the normal gastric mucosa is protected from acid digestion, and how tissue resistance, gastric secretion, and acid neutralization are precisely interrelated, are not yet fully known. Certainly the healing of chronic ulcer is not prevented by the presence of gastric acid, and such things as tone, motility, emptying time, and spasm have all to be taken into account.

Some of the many aspects of this subject were recently reviewed by Ivy[1] in a lecture under the title, "The Mechanisms of Gastric Secretion," in which he emphasizes again the two periods of gastric secretion—first, the continuous (or interdigestive), and, secondly, the digestive. The former is perhaps too often overlooked; it occurs when the stomach is empty, persists throughout long fasts, and is of variable amount and acidity. The nature of the stimuli which give rise to this continuous secretion is uncertain. It goes on during sleep, and Dragstedt[2] noted that in patients with duodenal ulcer the fasting night secretion of gastric juice totalled from 500 to 1,200 c.cm., compared with usually less than 300 c.cm. in normal persons. Experimentally it is possible in animals, by keeping up stimulation, to increase this continuous secretion, and in such cases typical chronic perforating ulcer has been produced (S. H. Walpole and others[3]). Ivy also points out that the continuous secretion is increased by operations on the upper abdomen, and describes how, after a Pavlov pouch has been made in the dog, the pouch will "hypersecrete" for days or weeks on end. Such secretion is diminished by atropine, though not abolished. The second period of digestive secretion is made up of three phases—the cephalic, the gastric, and the intestinal. The first of these acts through the appetite and is dependent upon both conditioned (cerebral) and unconditioned (non-cerebral) reflexes, the vagi containing the excitatory nerves, which are inhibited by atropine and may be interrupted by cutting. Vagotomy as a treatment for ulcer will therefore depend for its effects largely upon how far the cephalic (or nervous) phase of gastric secretion is contributing to the total secretion in the individual concerned, as well as upon the other results of vagal section on gastric tone, emptying time, and circulation. The gastric phase is governed by mechanical distension of the stomach, and partly by chemical secretagogues either present in food (e.g., lean meat) or arising from its digestion. The intestinal phase is entirely concerned with chemical substances which stimulate gastric secretion when applied to the intestine, of which soap, fatty acids, and peptone are examples. Neutral fat, on the other hand, when present in the small intestine inhibits gastric secretion through the production of a substance—enterogastrone—acting through the circulation. Gastric evacuation is largely determined by the antral tone, antral contractions, the activity of the pyloric sphincter, and the character of the food. The intestine also exerts control over the pylorus.

These various phases of gastric secretion may be considered from the standpoint of treatment: for example, the possibility of controlling the continuous night secretion by atropine, the inability of gastro-enterostomy to influence the cephalic or intestinal phase of secretion, the significance of mechanical distension in provoking gastric stimulation. Various extracts resembling enterogastrone in their action have been applied as inhibitors of secretion; but so far the only extract to be used with success has been that of the posterior pituitary.

Whatever may be the ultimate cause of peptic ulcer, the immediate lines of attack on questions of aetiology and treatment would seem to be by way of a thorough understanding of the mechanisms of gastric secretion and movement.

1 *Surgery*, 1941, **10**, 861.
2 *Arch. Surg.*, 1942, **44**, 438.
3 *Proc. Soc. exp. Biol. Med.*, 1940, **44**, 619.

GOOD AND BAD CHEMOTHERAPY FOR GONORRHOEA

Among experts in the treatment of gonorrhoea it has become a truism that the quicker a patient is cured the less chance (*a*) of his spreading the disease, (*b*) of his default before cure, (*c*) of his developing a blood dyscrasia, and (*d*) of the infecting gonococci becoming drug-resistant. Last week we published at p. 528 a letter from Col. L. W. Harrison, Adviser on Venereal Diseases to the Ministry of Health, appealing to all practitioners to help in the campaign against this disease by using sulphonamides for the treatment of gonorrhoea in such ways as are calculated to make the patient non-infectious as quickly as possible and to run the least possible risk of creating sulphonamide-resistant strains of gonococci. Col. Harrison's letter gained reinforcement from a letter published simultaneously from Dr. P. W. Hamond, medical officer in charge of the Croydon V.D. Clinic, who also deprecated the custom of giving sulphapyridine at sight in cases of urethritis without any bacteriological confirmation of the diagnosis and in doses likely to encourage a drug-resistant strain of organisms. It appears from these letters that many doctors are ruining the chances of eradicating gonorrhoea, and are often promoting its spread, by a timid haphazard dosage. There is now good evidence, says Col. Harrison, that administration of 5 grammes of sulphathiazole on two successive days eradicates gonorrhoea, in males at least, in over 90% of cases, and four days' treatment on the same lines gives still better results; "in neither case does such a dosage give rise to any undue proportion of toxic effects, provided that the patient is made to drink plenty of water during the period of the chemotherapy."

Mr. L. R. Braithwaite will deliver the Bradshaw Lecture, on "The Role of Bile in Duodenal Regurgitation," at the Royal College of Surgeons of England, Lincoln's Inn Fields, W.C., on Thursday next, November 12, at 3.15 p.m.

War Medicine Series

The paper printed below is based on a lecture which was one of a series recently given at the British Postgraduate Medical School, Hammersmith

TETANUS

BY

LESLIE COLE, M.D., F.R.C.P.

The causal organism of tetanus, *Clostridium tetani*, is a rod-shaped Gram-positive organism. Its most important attributes are that it produces spores which are highly resistant, that these spores germinate in wounds only under anaerobic conditions, and that it produces an exotoxin which is absorbed and has a strychnine-like action on the cells of the central nervous system. It is prevalent in soil and is a common inhabitant of the digestive tract of many domestic animals, particularly horses. Perhaps for this reason the disease is most often found in agricultural districts, where the spores are spread by manure and horse ploughing.

Predisposing Causes

The incidence of tetanus in a district or on a battlefield depends partly on the prevalence of spores in the soil and partly on the type of wound. Deep, penetrating, or lacerated wounds allow spores to develop under anaerobic conditions, and growth is also favoured by pyogenic or other anaerobic infection and the presence of tissue necrosis or foreign bodies. Such conditions are a commonplace of modern war. On the other hand, uncleanliness of slight or superficial wounds with scab formation, sealing of slight wounds, or infection of body cavities may also lead to tetanus, and these are now the chief sources of infection in civilian practice. Whitlows in agricultural workers are a not uncommon cause of severe tetanus. Other, though unusual, sources of infection are intramuscular injections, grey wool used in padding plaster-of-Paris splints and infecting the wound under the plaster, felt applied over a pressure sore, infected catgut, puerperal sepsis, and umbilical infection in the newly born.

With the widespread use of prophylactic antitoxin the type of wound which causes tetanus has been profoundly modified. After the obvious wound it is prevented, but it tends to crop up when least expected.

Prevention

With thorough organization it should be possible to prevent tetanus entirely, but once the disease has developed only a certain proportion of patients can be saved. Prevention is therefore of supreme importance, and two methods are now available.

Passive Immunization.—This is attained by injecting a small dose (3,000 I.U.) of antitoxin soon after a wound has been received. The value of this was proved when it was first introduced on a large scale during the early months of the war of 1914-18. The figures given by Bruce show that when this was done the incidence of tetanus fell from 9 per 1,000 wounded in September, 1914, to 1.4 per 1,000 in the November. Even when this does not prevent the disease entirely it usually lessens the severity and lowers the mortality. After prophylactic antitoxin cases generally have a long incubation period, relatively frequent local tetanus, and a slow onset of reflex spasms or sometimes none at all. It is important to remember that the passive immunity conferred by one such injection lasts only between two and three weeks, so that a wound in which infection with tetanus persists will produce the disease at the end of this time if no further prophylaxis is given. For this reason the injection should be repeated at weekly intervals after severe wounds, and an injection should always be given before operation or manipulation of old wounds because these have been known to stir up a latent infection. After some very severe heavily infected wounds the first prophylactic dose may with advantage be doubled.

Active Immunization.—Ramon and Zoeller showed that this could be produced by injections of formolized toxin (toxoid), and a modification of their method is now used in the British Army. Two injections of 1 c.cm., at an interval of six weeks, are given to the soldier before he goes on active service, and this procedure seems to confer immunity for a year and probably much longer. It is very important to remember that the rise in antitoxin titre is much greater after the second injection than after the first, so that a single injection has comparatively little immunizing power and the second must be given. It has been shown that the immunizing effect of toxoid is increased if it is given with T.A.B., and the two may therefore with advantage be combined.

The Passive and Active Methods Compared.—The disadvantages of the passive method are that antitoxin has to be given soon after a man is wounded, which is not always possible in modern war; that, occasionally, severe reactions follow or sensitivity to horse serum, given later, is produced; and that even when repeated the antitoxin does not always completely protect. The active method, on the other hand, only rarely produces slight reactions, has the great advantage that it can be completed before the soldier goes on active service, and does not need to be repeated until a year or more. Its efficacy has not yet been tested out on a mass scale over a long period, but experimental evidence and practical experience in this war suggest that it is reliable. For reliance to be placed on this method alone in an army it is clear that every man must be immunized; therefore it is important that exact records of injections should be included in his papers. At present both methods are used, prophylactic antitoxin being given to all wounded even if they have already been actively immunized.

Description of the Disease

At onset typical tetanus is characterized by fleeting pains, chiefly in the neck and back; these are followed by the gradual onset of stiffness, first affecting the masseters so that there is difficulty in opening the mouth, and later the muscles of the trunk so that the spine is rigid and slightly arched and the abdomen board-like. In the early stages the eyebrows are drawn up, with wrinkling of the forehead, and the corners of the mouth are drawn back, producing a peculiar facial expression called the risus sardonicus. Dysphagia is sometimes an earlier symptom than trismus. The severer the case the more rapidly rigidity and trismus increase, and they tend to be more and more increased by manipulation or movement. This reflex excitability gradually becomes greater until sudden reflex spasms occur in which the jaws are forcibly clenched, the chest is fixed so that respiration is temporarily stopped, and the spine arched backwards in the position called opisthotonos. These reflex spasms may come on any time from twelve hours to seven days after the first onset of trismus, and the earlier they begin the more severe and fatal is the disease likely to be. The time between the first appearance of trismus and the establishment of reflex spasms (period of onset) can generally be estimated to within six hours, and is a good indication of prognosis. If it is less than forty-eight hours, death usually takes place within six days whatever is done; but if it is longer than this there is a good chance of recovery, which becomes greater as the period lengthens. In severe cases which recover, reflex spasms may continue to occur over a period of three weeks, increasing to a maximum, waxing and waning for a time, and then gradually getting less severe until they cease, leaving only tonic rigidity, which may persist for several weeks more, but eventually passing off. Reflex spasms are dangerous because they stop respiration, sometimes for several minutes, make feeding impossible, and exhaust the patient. Tonic rigidity in itself is harmless. In fatal uncomplicated cases death usually takes place within six days either from prolonged respiratory spasms, if these are not controlled, or from cardiac failure when toxin reaches vital centres in the medulla. It is often preceded by hyperpyrexia.

Clinical Types

For convenience tetanus may be divided into five types, as follows:

Type 1, in which at onset there is local tetanus in the wounded limb with rigidity or twitching, and in which the typical generalized picture appears later.

Type 2, in which there is generalized tonic rigidity without reflex spasms.

Both these types are mild, and usually occur after prophylactic antitoxin.

Type 3, like Type 2, but the stage of tonic rigidity passes into the stage of reflex spasms described above.

Type 4—splanchnic tetanus—in which the muscles of deglutition and respiration are involved early and generalized symptoms are slight or do not have time to appear. This form is very rare and fatal, and usually follows a visceral infection.

Type 5—cephalic (Kopf) tetanus—in which paralyses or irritation of cranial nerves, most commonly the seventh or oculomotor, appear early and generalized tetanus only later. This type usually follows wounds of the head or neck, and may be regarded as a form of local tetanus. If the wound is not severe the prognosis as a rule is good.

Diagnosis

"Lockjaw" is a good name for tetanus because it emphasizes the most significant early symptom. A small girl was told that if she cut herself between her thumb and first finger she would get lockjaw. A few weeks later she did this, and a few days afterwards, finding that she could not open her mouth, she told her parents she had lockjaw. It was only after she had been seen by three doctors, and after a good deal of delay, that her diagnosis was confirmed and treatment begun. The onset of painless stiffness of the jaw after a wound should always suggest the possibility of tetanus. Other important confirmatory signs in the early stages are: rigidity of the spine, with slight arching of the back so that the flat of the hand can be passed between the bed and the small of the back without difficulty, and almost painless but board-like abdominal rigidity, increasing when the trunk or limbs are manipulated or the patient attempts to move. The facial expression is also an important diagnostic sign.

Differential Diagnosis

From the early occurrence of trismus, tetanus has to be distinguished from local affections of the mouth such as an impacted wisdom tooth, tonsillitis, peritonsillar abscess, or glands about the angle of the jaw. All these conditions are painful, while the trismus of tetanus is comparatively painless; and this fact, along with a careful examination of the mouth and throat, is usually sufficient to solve the difficulty. Local tetanus may be mistaken for neuritis or arthritis, but, in the former, stiffness or twitching is more marked and pain is less. Cephalic tetanus with cranial nerve palsies has to be distinguished from Bell's palsy, polio-encephalitis, and meningitis, and the generalized form from meningitis and encephalitis also. Tuberculous meningitis may simulate it very closely. In these latter, diagnostic lumbar puncture may be necessary. When abdominal rigidity comes on before trismus, tetanus may be mistaken for acute abdominal conditions such as appendicitis or perforated gastric ulcer, but pain is a more pronounced early symptom in the latter.

Finally, the reflex spasms have to be distinguished from other forms of convulsion such as hysterical or epileptic fits and those of strychnine poisoning, in which trismus is a less marked feature. In these a careful history will often solve the problem.

Treatment

This is best considered under four headings: Antitoxin, treatment of wound, control of reflex spasms, and feeding and general management.

Antitoxin

When toxin is exerting its effect on the nervous system it is extremely doubtful if it can be neutralized by antitoxin; consequently if a lethal dose is so acting before antitoxin is given, this treatment cannot save the patient. Happily in most cases antitoxin can be given early enough to prevent the absorption of a lethal dose. The first need, therefore, is to flood the circulation with antitoxin as soon as possible after the first symptoms have appeared, so that toxin in the blood and lymph which is still accessible to antitoxin is neutralized and any further absorption from the wound prevented. A single large dose (200,000 I.U.) should be given by the intravenous route or, if this amount is not available, as large a dose as possible. In the case of wounds of a limb 10,000 units may also be injected into the subcutaneous tissues round the wound or deeply girdling the limb above the wound.

Repetition of Doses.—In cases with slight wounds I am very doubtful if anything is to be gained by giving further antitoxin. With severe wounds 50,000 units should be repeated at weekly intervals or before any operation, until reflex spasms have ceased. It is difficult to see what is to be gained by daily repetition of injections, for it has been shown that antitoxin continues to circulate in large amounts for at least ten days after a big initial dose, and repeated injections are a worry to the patient and tend to increase spasms. To continue to give antitoxin after the reflex spasms have ceased and only tonic rigidity remains is a sheer waste.

Other Routes.—Antitoxin is also given intrathecally and cisternally, usually in combination with intravenous injections, and good results are claimed by some workers; the evidence, however, is conflicting. In my opinion nothing is gained and a great deal may be lost through the excitation of spasms by such procedures, and they are better avoided, particularly under Service conditions. If for any reason antitoxin cannot be given intravenously it should be given intramuscularly.

Before using antitoxin inquiry should be made as to previous serum therapy and for any history suggesting a tendency to allergy or anaphylaxis, and in cases of doubt desensitization should be carried out. If no contraindications are found the serum may be injected direct into a vein and need not be diluted or warmed. A solution of 1 in 1,000 adrenaline should be at hand in case of reactions.

Treatment of Wound

The wound should be touched as little as possible for an hour after antitoxin has been given. The aim should then be to convert an anaerobic into an aerobic infection by thorough drainage and removal of necrotic and infected tissue and foreign bodies. Wounds should be irrigated four-hourly with hydrogen peroxide through Carrel's tubes if for other reasons this is suitable, and dressings should not interfere with free drainage. It is thought that the practice of early excision of wounds, which was introduced in 1917, lowered still further the incidence of tetanus. The occurrence of tetanus may also be a factor in favour of amputation when this is considered for other reasons.

Control of Reflex Spasms

Tonic rigidity in itself is not dangerous; but reflex spasms exhaust the patient and stop respiration, and it is these which need to be checked. The rate at which they develop is the best indication of their approaching severity. If they begin within forty-eight hours of the first onset of trismus they usually increase rapidly both in frequency and in intensity, and may be very difficult to control. In such cases it is well to make preparations to deal with a sudden prolonged spasm should one occur without warning.

In mild cases and in the early stages before reflex spasms have begun, doses of potassium bromide up to 20 grains two-hourly or sodium luminal up to 1 grain four-hourly usually suffice for sleep and rest and to lessen the excitability of the nervous system. When reflex spasms come on they are most easily controlled by avertin or paraldehyde, given rectally as for basal anaesthesia. The dose of avertin should be between 0.07 and 0.1 c.cm. per kg. of body weight (estimated), and this usually stops spasms for from four to six hours. After this the dose has to be repeated, and it is sometimes necessary to give three such doses a day, and often two a day for some days consecutively. The effect in the individual patient and the frequency and severity of the spasms when they recur are the best indications for dosage. The dose of paraldehyde should be at least 1/2 drachm per stone dissolved in normal saline (1 drachm to 2 oz.). Both avertin and paraldehyde tend to produce cyanosis, and this should be controlled by

warmed oxygen given by catheter or mask. Evipan intravenously is useful, particularly for sudden severe spasms which stop respiration completely; as also is nembutal, 1½ grains by mouth and repeated. Morphine and heroin should be employed sparingly, but are useful at times. Nitrous oxide and oxygen, chloroform, and ether are also occasionally of value, but if spasms are severe they cannot be inhaled. With all sedatives the risks of overdosage have to be weighed against the risks from the disease. If there is moisture in the lungs atropine should be given subcutaneously.

Feeding and General Management

Reflex spasms are excited by external stimuli of all kinds, and these must be reduced to a minimum. Patients should be kept as quiet as possible in a darkened room or at least be screened from others. The bedclothes should be cradled, and all necessary manipulations, such as feeding and the giving of injections, done while the patient is most deeply under the influence of sedatives. In severe cases a sister or orderly should be near the patient all the time. It is important to maintain strength by giving plenty of nourishing fluids and feeds whenever opportunity occurs. Glucose or cane sugar in water or weak lemonade, milky foods, egg and milk, broth, and bovril are all good, and the last two tend to make up any loss of chlorides from excessive sweating. When trismus is severe it is sometimes necessary to extract teeth before feeding is possible, and occasionally feeding by stomach tube is necessary. Avertin is often of great value in relaxing the jaw, and the attempt to feed should be made from one to three hours after the drug has been given. Feeding by rectal drip is also occasionally useful.

On active service the question may arise whether patients should be evacuated. The decision may be a difficult one and, apart from the wound, depends chiefly on the severity of the reflex spasms and the stage which the disease has reached. Patients who have not developed any reflex spasms four days after the onset or whose spasms have almost subsided can usually be moved with safety. Those who are developing them within four days or who are still having severe spasms should stay.

Complications and Prognosis

Pneumonia is a not uncommon and a fatal complication, and, if suspected, sulphapyridine should be given. Retention of urine occasionally occurs, and hyperpyrexia is usually a terminal event. The latter should be treated by antipyretics and tepid sponging. Sequelae of tetanus are rare.

In arriving at a prognosis the factors that have to be considered are: whether there has been active or passive immunization; the severity, degree of infection, and site of the wound; the length of the incubation period and period of onset; the age and physique of the patient; the presence of intercurrent disease or injury, loss of blood, or exhaustion; the severity of reflex spasms; and the conditions under which treatment can be carried out. An incubation period of more than seven days, a period of onset of more than two days, the presence of local tetanus, and a slight wound only, are all in favour of recovery. Other things being equal, the prognosis is better with wounds of the leg than with those of the head, neck, or arm. In war, intercurrent weakness from the severity of the wound itself, from haemorrhage, and from exhaustion has to be weighed against the beneficial effects of active or passive immunization.

The 34th annual meeting of the Medical Benevolent Society for the East and North Ridings of the County of York (including the City of York) was held in the rooms of the York Medical Society on Sept. 30, Dr. C. H. Milburn of Harrogate presiding. The treasurer's report showed the society to be in a sound financial position, and it was decided to make further investments in Government securities. Since the last meeting two members had died, and sympathy was expressed with the relatives. One new member was elected. The annual grant to the dependants of an invalid member was renewed. The following officers were elected for the year 1942-3: Dr. M. Jacobs, Hull, President; Dr. Howard Jackman, York, President-Elect; Dr. G. F. Longbotham, Middlesbrough, Vice-President; Dr. D. Matheson Mackay, Hull, Hon. Treasurer; and Dr. W. W. A. Kelly of 92, Micklegate, York, Hon. Secretary, to whom inquiries may be addressed.

SOME OBSERVATIONS ON SENDING ASSISTANCE TO BOMBED TOWNS

BY

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I put forward these observations with some diffidence though they are written dogmatically. Many may be more experienced, but I have not had the good fortune to read their papers on the subject. If this paper provokes a discussion it will have served some useful function. Apologies are offered for the overuse of the "first person singular," but this is a personal report, and the observations and deductions are in no sense official.

In the winter of 1940-1 Bristol received its average share of air raids. I was active in all save one of these and learnt first-hand lessons. As the winter of 1941-2 approached we were all keyed up to face the bombardments that never came. Instead raids were made on smaller neighbouring towns, notably Weston-super-Mare and Bath. It is obviously possible to view a raid on a neighbouring city with considerable detachment. Such vision may be useful, and I had the good fortune to assist in the "good-neighbour policy" in all these raids. In each case we spent part of the time in the "blitzed city" and part of the time organizing in the "rescuing city." This was possible as the raids were repeated on the second night in each town.

On the whole the good-neighbour system worked well, but it is felt that many improvements could be made. I do not propose to detail what was done—this might be invidious—but the following commentary may be of interest. Admittedly some of it is painfully obvious, but most British cities found that it took actual bombs to drive the lessons home!

Communications

It is clearly vital to establish some sort of contact between the city needing rescue and the rescuer. It is true that rescue parties can be sent fully equipped and self-contained to a considerable degree, but usually fresh supplies, relays of helpers, etc., are necessary. As a busy voluntary hospital, heavily worked and with a war-depleted staff, we do not carry supplies sufficient for "self-contained" as opposed to "shuttle or circulating" rescue work. A fully self-contained unit would obviously need rations, a field kitchen, water, etc. None of this is available, nor is it considered desirable, though certain improvements along these lines could be made. In the case of the Weston raid, phone communication with Bristol was good though the line was sadly overworked (raid excitement) and messages were repeated unnecessarily—for example, a request for more sulphapyridine was separately phoned up by four officials.

In the Bath raids communication was bad. (This is written in terms of the hospital personally visited.) I arrived there at 2 p.m. on the day after the first raid. (I was then leading a surgical team under orders from the Group M.O.) We saw cases and operated till 12 midnight, staying at the hospital for the second raid. At 4.45 a.m. casualties were again arriving. Since leaving Bristol we had been unable to contact Bristol or the other Bath hospitals. The sole contact was the visit of a dispatch rider at 4 p.m. on the first day. We had then been there only two hours and were in no position to know what extra help might be needed, as the problem had only just been surveyed—e.g., some 60 casualties in an unfamiliar hospital with facilities for two teams to operate. At that time we were not *au fait* with the laundry position or the drug and dressing position.

At 6 o'clock on the morning of the second raid I returned to Bristol in my own car to obtain further aid. Clearly this was wrong. It should not be necessary to detach a surgeon to act as a dispatch rider. It is now obvious that when the dispatch rider called at 4 p.m., the aid I should have requested was the honour of a further inspection at, say, 10 p.m., when we would have understood the situation better. We should then have known enough to appeal for rations. The large team

I brought was deplorably fed, yet it worked for 24 hours except for a 4-hour break, and most of its members had been up and doing in Bristol for 14 hours previously. Good warm drinks and substantial meals are necessary for the nurses, doctors, and others in such circumstances.

It is suggested that the best system of communication would be as follows:

The Group Officer's nominee (subsequently termed the "Peripheral Group Officer") should visit the bombed city at the earliest possible moment after the raid. He should inform himself of the situation and establish a centre for his messages, probably at the largest hospital, definitely at any hospital able to telephone. He then phones his opposite number in the rescuing city or sends in his dispatch rider (who often could phone from just outside the city, saving time) and makes his wants known. This shuttle service must be kept alive until the work of "the incident" is over. The Central Group Officer can then organize all the help necessary. The Peripheral Group Officer must continually inform himself (not wait for information) how the hospitals in the bombed area are faring and their needs as they arise. For example, the destruction of a laundry at Weston created an immediate laundry problem. I initiated an immediate "lease-lend laundry system," with Bristol doing the wash. A functioning Peripheral Group Officer is in my opinion vital, to avoid overlap and duplication, often multiplication, of rescue services.

When Should Help be Sent?

When a small city is bombed there is no need to wait for a request for help. Surgical help should leave with the Peripheral Group M.O.'s team, the latter to be fully responsible for communication (detailed above). The hospital in the bombed city may be cleverly organized, but it will need help. If it is so staffed that it does not require help in an air raid, then it is over-staffed and is wasteful of man-power, and doctors should be requisitioned from it for military service! The policy of "waiting to be asked" is pernicious. Suitable help courteously offered will always be welcomed. It is not necessary to mention that the bombed cities alluded to asked for help and sensibly used it, and have sent subsequent thanks which were much appreciated. In one city that was helped, on the arrival of the rescuing team the whole resident M.O. staff of the hospital retired to bed—a sensible manœuvre.

What Type of Help should be Sent?

I have firm views on this subject, and they conflict to some extent with E.M.S. authority as stated in the "Red Book." However, I will venture to dogmatize.

1. The "Shock Troops" Team

The first help to be sent should be strong parties of medical students with a few sensible housemen. These I consider my shock troops—they are "go-anywhere-do-anything men." They will give a blood transfusion, take a blood pressure, shave a head, write notes (vital: I have seldom seen a "General" write a note), put out a small fire, act as stretcher-bearers, give simple anaesthetics, form a minor surgical team, and generally do the ten-thousand-and-one things that "proper doctors" seem to find beneath them. The supreme pull of the big city over the smaller is not in the greater excellence of its consulting staff but in the number of its medical students. Where possible I would include in the shock division that other salt of the earth, an almoner with her clerk. This division, warmly clothed* and well fed, should be on the road within 1½ hours of news of "the incident." This news came in about 3 a.m. when there was a midnight raid 25 miles away, though I am convinced this information could be expedited. The "shock troops team" and the Peripheral Group M.O.'s team can well leave together.

2. Surgical Teams

The surgical teams that seem to be so beloved of the E.M.S. can well leave at a much later hour, say breakfast-time. They are not needed in the first few hours unless the stricken area has no surgeon at all (highly improbable), in which case a surgeon must leave with the shock troops. Most casualties can well do with a few hours' rest; the few "vitally urgent" cases can be dealt with by the local surgeons, who, having withstood the night's raid, will appreciate relief at 9 a.m. to see to their own homes, etc., but who do not want relief at 5 a.m. or 6 a.m.

The surgical team should consist of surgeon, assistant, anaesthetist, two nurses with theatre experience, and a sufficient number of medical students. The wise surgeon will pack his own kit; every surgeon will have his own fancy, but in air raids the best surgeon is the one who needs the least tools. I have a passion for taking razors (and a student to hone them) and nail-brushes; experiences of "hair like barbed wire" have developed this taste. I may here cavil at the usual theatre technique. The surgeon's clean washed hands are usually an improvement on the patient's wounds, while the ordinary theatre ritual is fantastically oversafe for a primary amputation or excision of wound edges of, say, a hole in the buttock. It is well to carry goods for one's own comfort—e.g., a theatre suit, gum boots, and a mackintosh. The visiting surgeon who bothers the visited hospital for these things is *not* helping—he's wasting time, energy, and tempers. Ideally, a surgical team should be relieved every 8 to 10 hours, otherwise efficiency will fall off. The provision of relief is the duty of the Peripheral Group M.O., whose job is always to view and review the problem, note how the work is progressing, and contact the centre. The surgeon in these teams should be a good general surgeon.

If one took the E.M.S. "Red Book" too literally the first duty of an M.O. at an E.M.S. receiving hospital apparently would be not to treat the sick but to notify them to someone else! Vide the following extracts:

> Page 17, para. 25.—"Whenever a patient with head injuries is admitted to a hospital the Regional Consultant must be informed immediately, if possible by telephone confirmed in writing, unless the patient has been admitted or transferred to a special centre, or has been visited by a neurosurgeon."
>
> Page 15, para. 20.—"Chest wounds, whether admitted direct or from first-aid posts, should not be retained at casualty hospitals, but should be evacuated as soon as possible to one of the special chest centres. If a case is not transferred at once the Regional Consultant must be informed immediately, if possible by telephone as well as in writing. A copy of the notification must also be sent to the Regional Hospital Officer, or in the case of the London Sectors to the D.G.E.M.S. at Whitehall. All penetrating wounds and severe crush injuries of the chest must be notified, but there is no need to do so in the case of surface wounds or simple fractures of the ribs."

Fortunately, so far as my information extends, England is full of doctors who read these regulations with a blind eye or swallow them *cum grano salis*. It is not disputed that they may be right and proper in "quiet periods" in a hospital; certainly they are *de trop* in a blitz period.

3. The Special Technique Team

By "special technique team" I mean those surgeons and assistants whose work requires trained assistants and, maybe, special instruments, etc. These teams may be found in neurosurgery, fractures, thoracic work, burns, and facio-maxillary work. Their use calls for much thought. I do not deny that many difficulties arise. There are various possibilities, and it is well to discuss them. The "quiet period" duties of these teams are clearly those of (i) attendance to routine duties; (ii) dissemination of information to their colleagues who practise in a more general way; (iii) holding demonstrations of technique, etc.

Their duties in a raid are less easily defined. Three possibilities emerge: (A) Should they remain at their base ready to deal with what comes to hand? (B) Should they await the summons of the Peripheral Group M.O.? (C) Should they tour the hospitals in the bombed city seeking their wounded amid the debacle? It is assumed that all these "specialists" cannot do both A and B. If they can, then there are far too many of these single-minded gentlemen, and they should be drafted elsewhere! In fact, the super-specialists should be organized, like the National Fire Service, on a drafting basis.

Possibility A is not ideal. In practice the patient does not often reach the right centre, and certainly not unharmed.

* Battle dress for shock troops is old clothes, a torch, pencil and pad, and a pair of dressing scissors.

With regard to possibility B, it is argued that the Peripheral Group M.O. will not be properly advised when to call for the special technique team and that delay may thus occur. This is surely a matter for education. (My own criterion of the "F.R.C.S. standard" is a "young surgeon who knows when he doesn't know.")

The third possibility (C), the "touring the battle-front" idea, raises interesting points—e.g., Who should tour? What should he take? The practice of the consultant touring alone is almost valueless. If he gives a little advice in the excitement of an air raid it may or may not get properly acted upon. If the consultant himself rolls up his sleeves and actually works, then he is working in strange surroundings minus his subordinates and cannot do the case justice. Further, he is likely to have a case that takes a long time, while the theatre door is crowded with fuming general surgeons waiting to lop off a leg or excise a wound.

In this connexion I put up two workable ideas for criticism.

(*a*) Let the consultant tour alone, *but* let him take an ambulance with him and let him seize the suitably wounded and *there and then* pack them off to his centre. Of course this will mean that the early bird will get the worm, for I must confess to having seen cases of multiple injury from air raids.* It is clear that the consultant cannot be "selecting winners" on the spot and curing them at the centre at one and the same time. It is assumed, however, that the rest of his team remain at the base, and in the absence of the General they carry on. If they are unable to act alone another consultant must move to the centre or base as its own consultant moves to the periphery.

(*b*) The consultant arrives fully equipped with his own team and tools and does the work on the spot. "Fully equipped," then, should mean "everything," or almost everything, the battle area supplying only a room. This method is expensive and it is slow. The necessary three-ton lorries would have to leave at the start of the incident. If their personnel was dispersed at all it would take a long time to collect. I once made plans with Brigadier Cairns for the Oxford Neurosurgical Service to relieve Bristol in this manner. We never tried the experiment, but my opinion is that if from Bristol an S.O.S. was sent at 12 midnight the lorries with relief might roll in about 12 noon the following day, probably later. Say 3 hours to get an S.O.S. out, 4 hours to collect and feed the team (one on week-end leave, one ill, one at a new address, etc.), and 4 to 6 hours on the road. Anyway, the E.M.S. has not provided fully equipped civilian teams in the sense alluded to—at least not in my region.

Probably choice *a* above is the better in view of present conditions. Choice *b* is certainly worth trial, and could be experimented with in one or two regions, and data collected.

4. Nursing Relief

This is important, and requires nice judgment and execution. A two-nights-running air raid is a heavy test of the usually busy, usually under-nursed general hospital. If to the admission of numbers of casualties be added minor bomb damage (windows blown in, no black-out, etc.) and noisy excitement in the daytime precluding rest, then the strain on the night nurses is heavy. We tried the experiment of exchanging units of nurses between the central city and the bombed town, thus providing a "quiet night." This needs much arranging and nice timing when all hospitals are working full out with minimal staffs. Two experiences in practice are related, and are instructive:

Twenty nurses were sent at 9 p.m. to the Weston General Hospital after the second night's raid (obviously no one knew if a third night's raid would occur). These nurses were courteously received and were distributed among the wards; during the night the local nurses were each given 4 hours off duty and their work thus lightened. Had a raid occurred the augmented staff could easily have shared the work. (A similar exchange of house-surgeons is desirable.) A similar party of 20 nurses were sent to another hospital, where the matron had already been advised to expect them. They were met on arrival, told they were not wanted, and sent back crestfallen to Bristol. What a lack of imagination and tact! The hospital in question did not even notify this action to the A.R.P. organizer, with the result that next day a bus was sent to fetch back nurses who had been returned the night before!

These contrary experiences merely confirm the need for good planning.

Summary

The salient features of the above observations may be summarized in the form of a time-table, thus:

Time	Duties of Central Bureau Officer at "University City"
Say 12 midnight	Incidents at Blankville (It is assumed that Blankville is 1 hour away by ordinary car)
00.30 hours	Notification received at "University City" of Blankville's blitz Immediate summoning of shock troops and Peripheral Group M.O.'s unit. Consideration: "Has Blankville surgeons enough or should a surgeon be sent *now*?"
02.30 hours	Departure of Peripheral Group M.O. and shock troops, all fed warm, transport fixed, etc.
03.00 hours	Warn special consultants and general teams to stand by for 8 hours
04.00 hours to 05.30 hours	(Depending on communications available to receive messages from Blankville.) Assess the degree of help which may be necessary
08.30 hours	Dispatch surgical relief teams *quantum sufficit*. Begin to plan for their relief S.O.S. N.B.—Information should be arriving constantly from the Peripheral Group M.O.
09.00 hours	Arrange for evacuation of beds in Blankville S.O.S. [And so on, depending on the seriousness of the air raid.]

* In these cases the zealous resident must notify (see "Red Book") three or four different consultant advisers and later divide the single patient among three or four different hospital centres. In the interests of logic the E.M.S. should appoint a multiple-injuries specialist and have done with it.

PROPOSED NEW MEDICAL SCHOOL FOR LONDON

FOUNDED ON L.C.C. SERVICES

The establishment of an undergraduate medical school founded on the hospital services of the London County Council—which are by far the most comprehensive in the country and perhaps in the world—is proposed in a report which has been presented to the Council by its General Purposes Committee. The report is in the form of a statement of evidence to be given by the Council to the Interdepartmental Committee on Medical Schools recently set up by the Minister of Health and the Secretary of State for Scotland under the chairmanship of Mr. W. M. Goodenough.

The new school would be established at one of the L.C.C.'s larger general hospitals and would utilize other hospitals and institutions as required. It is assumed that it would become an internal school of the University of London, which, in agreement with the Council, would provide the professional and teaching staffs. The arrangement would be similar to that obtaining at present between the British Postgraduate Medical School and the L.C.C. Alternatively, the Council itself might be responsible for the general direction of the school, as in the case of the school for teaching in psychiatry attached to Maudsley Hospital. It is claimed that the experience which the L.C.C. has gained during the last 7 years in the case of the British Postgraduate Medical School (in which it has satisfactorily met any necessary modifications in the administration of Hammersmith Hospital) should be of great value in dealing with any new project on these lines. Any arrangement which the Council would make to extend medical education would be open to women students equally with men. On the financial side the Council would expect to be treated by the Government no less favourably than the voluntary hospitals and present medical schools.

The L.C.C.'s interest in medical education flows from its position as the major health authority for London, from the fact that it is the largest civilian employer of medical staff in the country, and from the facilities which its hospitals, numbering about 100, and its health services afford for a complete medical education. For some years past it has provided for the clinical teaching of undergraduate medical students by the affiliation of its general hospitals with voluntary teaching hospitals for teaching in obstetrics, fevers, psychiatry, venereal diseases, and other subjects. Up to the outbreak of war 11 of the medical schools were linked with 16 of the Council's "acute" general hospitals, in which classes and demonstrations were held, conducted by the resident medical staff, the Council's consulting staff, or members of the teaching staff of the students' medical school. Instruction in obstetrics has already been given

at 10 of the L.C.C. hospitals to students from 9 of the London medical schools. Emergency courses of instruction in fevers are given at the fever hospitals, and, although the arrangements are not systematized, lecture-demonstrations to undergraduates are given at most of the mental hospitals. Plans are in hand for the teaching of psychological medicine in the Council's mental health services after the war.

In so far as the Council's resources are used to augment the teaching in voluntary teaching hospitals (apart altogether from the proposal to set up the new school) the report calls for closer integration, particularly from the point of view of continuity of teaching. It is suggested that an advisory board be appointed for each combination of linked hospitals to make recommendations to the hospital authorities concerned for the appointment of teaching staff, the personnel of the board to consist of representatives of voluntary teaching hospitals and of the L.C.C., with whom representatives of London University would be associated. Teaching appointments should be regarded as including university chairs and readerships and the recognition of holders of whole-time posts as teachers of the university, while part-time consultants and specialists would be available for work in either voluntary or municipal hospitals, or both. If it is decided that a student after qualification but before registration should be required to hold a house appointment, the Council would consider a reasonable adjustment of its medical staffing arrangements to enable that to be done.

It is also considered that the service which the L.C.C. performs in the field of public health and social welfare should be brought more closely to the notice of medical students as a means of acquainting them with the wider aspects of social and preventive medicine, and the Council is prepared to offer facilities for organized instruction in the public health services and for the appointment of its staff as lecturers. Finally the report calls for better co-ordination of the facilities for postgraduate medical education in London, and the closer linkage of any new centres of postgraduate instruction with the British Postgraduate Medical School as the nodal point.

APPROVED NAMES FOR DRUGS

THE PHARMACOPOEIA COMMISSION'S POLICY

During the war the General Medical Council has published from time to time, on the recommendation of the British Pharmacopoeia Commission, lists of approved names for substances produced by British manufacturers, in some instances under licence granted by the Comptroller-General of Patents, Designs, and Trade Marks. The intention has been to recognize non-proprietary names which could be used freely by manufacturers, and thus to avoid the difficulties to medical men and pharmacists which result from a multiplicity of names for the same substance. When any of the substances for which names have been approved have been admitted to the *Pharmacopoeia*, the approved name has been made the official title, but the recognition of an approved name does not imply that the substance will necessarily be admitted to the *Pharmacopoeia*.

The Pharmacopoeia Commission has now formed an advisory committee on nomenclature to assist it in the selection of approved names. Suggestions for suitable names will be invited from the manufacturers interested in the production of a substance for which an approved name is required, and full consideration will be given to the suggestions received. The Commission hopes that the approved names will be generally adopted, and would deprecate especially the introduction of new names for substances for which approved names have been published.

Principles of Nomenclature

The Commission has adopted the following statement of principles as a guide in the selection of approved names:

1. Names should, preferably, be free from any anatomical, physiological, pathological, or therapeutic suggestion. This applies only to chemicals. Such suggestion cannot always be excluded in the naming of biological products.

2. The accurate chemical name should be used if suitable; when it is unsuitable an attempt should first be made to form a name by the combination of significant syllables from the scientific chemical name, and to include an indication of the potent element or constituent of a compound.

3. Names should be, in general, preferably of two, three, or at most four syllables.

4. Names should be distinctive in sound and spelling, and should not be liable to confusion with names already in use.

5. Names which are difficult to pronounce or to remember should be avoided.

6. The addition of a terminal capital letter or number should be avoided.

7. Names used in the current *United States Pharmacopoeia*, or adopted for the next revision, should be used either as principal titles or as synonyms.

8. Names used in the *British Pharmaceutical Codex* or in *New and Non-Official Remedies* should receive preferential consideration.

9. The following terminations, which are now well recognized, should be used so far as possible:

-ine (Latin -ina), for alkaloids and organic bases;
-in (Latin -inum), for glycosides and neutral principles;
-ol, for alcohols and phenols (-OH group);
-al, for aldehydes;
-one, for ketones and other substances containing the CO group;
-barbitone or -itone, for drugs of the barbiturate group;
-caine or -aine, for local anaesthetics.

Approved Names already Published

Certain names originally published as approved names have now been made official by the inclusion of monographs in *Addenda* to the *British Pharmacopoeia, 1932*.

Official Names: Third Addendum	*Other Names*
Bromethol	Avertin
Carbachol	Doryl
Hexobarbitone	Evipan
Iodoxyl	Urosclectan-B
Leptazol	Cardiazol
Mepacrine hydrochloride	Atebrin
Mepacrine methanesulphonate	Atebrin musonate
Nikethamide	Coramine
Phemitone	Prominal
Soluble hexobarbitone	Evipan sodium
Stibophen	Fouadin
Official Names: Fourth Addendum	
Pamaquin	Plasmoquin
Suramin	Germanin (Bayer 205)

New official names were given to certain substances included in the *British Pharmacopoeia, 1932*, and the *Addendum* 1936. For those names reference should be made to the relevant publications.

Approved Names	*Other Names*
Amethocaine hydrochloride	Decicaine
Cyclobarbitone	Phanodorm
Dienoestrol	Di-*p*-hydroxyphenylhexadiene
Diodone	Perabrodil
Diphenan	Butolan
Dithranol	Cignolin
Ethisterone	Ethinyltestosterone; lutocyclin; lutogyl; pregneninolone; progestoral; proluton C
Hexazole	Azoman; triazole
Menaphthone	2-methyl-1 : 4-naphthoquinone (Menadione *U.S.P.* XII)
Meprochol	Esmodil
Mesulphen	Mitigal
Pethidine hydrochloride	Dolantin
Pheniodol	Biliselectan
Pholedrine	Veritol
Soluble phenytoin	Epanutin; eptoin; sodium diphenylhydantoinate; solantoin; soluble dilantin
Sulphacetamide	Albucid

AWARDS FOR GALLANTRY

Mr. DENNIS OWEN CLARK, F.R.C.S., medical officer, mobile unit, Weston-super-Mare, has been appointed an M.B.E., and the G.M. and the B.E.M. have been awarded to Mr. HENRY COX and Mr. WILLIAM JAMES TYE, members of a rescue party, respectively. The citation in the *London Gazette* reads:

"During an air raid a house was demolished and five people were buried in the debris. Cox cut a hole in the floorboards and reached a woman, whom he released. He then came to a boy who was buried, lying on his back. Cox removed some debris by hand, freed the boy, and turning on his own back was able to drag him out. Tye then went into the tunnel to try to release a girl whose legs were pinned between boxes which were taking the weight of some tons of debris. This could not be moved without the risk of killing two other trapped persons. Although the whole structure was liable to collapse, Cox and Tye worked in relays, and, with their bodies, shielded the child from falling masonry and rubble, receiving cuts on their heads in so doing. Periodically, Dr. Clark went in the small opening to administer morphine and finally to perform the delicate operation of amputating the girl's leg, but this was found to be unnecessary, and after five hours she was released. Cox and Tye showed great courage and devotion to duty and the calmness and efficient demeanour of Dr. Clark inspired confidence in the victims and rescuers."

Reports of Societies

INFLUENZA EPIDEMICS: SOME CONUNDRUMS

In the Section of Pathology of the Royal Society of Medicine, on October 6, Dr. C. H. ANDREWES, F.R.S., delivered his presidential address, which he had entitled "Thoughts on the Origins of Influenza Epidemics," and propounded certain conundrums, with the broad lines on which the search for a solution might be made.

Of the periodical outbreaks of influenza the major ones were apparently due chiefly to influenza A, the virus isolated in 1933 and previously called "epidemic influenza virus"; others might be due wholly or partly to influenza B, the virus isolated independently by Francis and Magill in America in 1940, resembling the virus recovered earlier in being pathogenic for ferrets and mice but immunologically quite distinct. But along with the lesser influenza A outbreaks there occurred many cases of clinical influenza (called in America "influenza Y") which yielded no laboratory evidence that either of these viruses was concerned. A second conundrum was that influenza A viruses varied from one outbreak to another alike in rapidity of spread in the human population, in the ease with which they were established in ferrets, and in the ease with which the ferret-adapted strains could be got to infect mice. On the whole, the strains most infective and virulent for man had been those which most readily infected laboratory animals, but this relationship was by no means certain. Yet another problem was the whereabouts of influenza virus between epidemics. Influenza was only prevalent in Britain every other year, and when it came it was almost confined to the months January to March. The virus seemed to disappear for about 21 months out of 24, and this two-yearly rhythm roughly coincided with what was occurring on the European Continent and in North America. Swine influenza showed a somewhat similar regularity. It broke out in herds of pigs on the Middle West every winter and the virus disappeared every summer. Shope suggested that the virus had been seeded into the herd well ahead of the epidemic, but produced no disease until some trigger, such as change of weather or exposure to wet, fired off the epidemic. Did influenza virus persist in a masked or occult form, not necessarily, as in the case of the pig, in a worm in the lung? Again, there was the puzzling circumstance that some relationship was shown to exist between the immunity of an individual and the level of neutralizing antibodies in his serum, and yet potent antibodies diminished only to a limited extent his liability to infection.

The Search for a Solution

Dr. Andrewes then passed on to consider the broad lines along which he felt that a search for an answer to these various conundrums might be profitable. He discussed the supposed evolution of a virus on the presumption that the occurrence of influenza in an individual or community depended to some extent—not solely—on the grade of influenza virus; no doubt the specific and non-specific resistance of the individual or community, the weather, and social conditions also played their part. Nor did he suggest that influenza viruses of one outbreak would all belong to one grade; rather would the mean of the virulence grade of prevalent viruses vary from time to time. Two facts, when placed in juxtaposition, made him pause. This country was remarkably free from influenza for some years before 1890, but after the epidemic prevalence of the early 'nineties influenza had never fallen to anywhere near the 1890 level. Evidently an abnormal influenza epoch set in. The other fact was that in 1934, 1936, 1938, 1940, and 1942 influenza A, so far as could be judged from laboratory tests, was practically non-existent in England and Wales, and yet, as compared with the pre-1890 era, these had been years of relatively high prevalence of clinical influenza. Apparently waves of influenza A had been superimposed on an increased prevalence of something which was not influenza A. He was attracted by the hypothesis that the influenza virus had been regularly taking a heavier toll of human lives since 1890 than during the forty years before that, but that only in certain years had circumstances allowed it to attain that grade at which it became recognizable as influenza A.

Believing that the conception of a basic influenza virus suggested new lines of experimental attack, he went on to picture a human community in winter-time. A certain number of people might be carrying avirulent basic influenza virus, which spread by seasonal coughs and colds, and increased its grade of virulence by passage through a series of unduly susceptible persons until it caused symptoms. Three recent descriptions recorded influenza outbreaks in communities following upon epidemics of febrile catarrhs a few weeks earlier which had yielded no virus; the catarrhs might have played a part in the genesis of the influenza outbreaks. But a catarrhal outbreak must not be expected to precede one of influenza in every locality. A moderate view would picture epidemics of influenza as arising not from a single source or from latent infections of ubiquitous distribution, but from a limited number of scattered foci. When virulence had been speeded up locally, further spread by droplet infection could occur in the orthodox way. In such circumstances an increase in grade of virulence and spread through the community would take place or slow down according to the strength of various factors, including probably the average antibody level. Passage through very susceptible persons would heighten the grade of virus, and passage through the relatively immune would induce a fall. This idea of a gradation in properties of influenza viruses from basic virus to pandemic virus afforded a feasible explanation of the conundrums.

Possible Prevention or Control of Epidemics

Could such a picture assist in the prevention or control of influenza epidemics? The sequence of events leading to an epidemic was complex and might be interrupted at several different points. It might be attacked at its beginnings when virus of low grade was finding opportunity to spread widely. Improvement of aerial hygiene by better ventilation and other measures, if it decreased other respiratory infections, might make it difficult for influenza virus to get up its evolutionary momentum. Present methods of vaccination had only a limited value in protecting individuals, but influenza might quickly peter out if introduced into a closed community most or all of whose members had been recently vaccinated and whose antibody level was accordingly high; this was specially likely if the virus had not already attained too high a grade. Burnet in 1937 suggested that intranasal instillation of living attenuated virus might prove an effective immunizing procedure. The idea had theoretical advantages, but it was not yet known how to attain at will a safe and effective attenuated virus. It was rather like the lighting of small controllable fires in advance of a dangerous spreading conflagration, only to be done in the face of grave menace and if one was sure that the fire one had lighted would not get out of hand. Another suggested method of control for which good results had been claimed was local passive immunization of the respiratory mucosa by inhalation of atomized antiserum.

Should pandemic influenza recur Dr. Andrewes believed it would be found to be primarily a virus disease, and that the virus would be rather different from the influenza A virus of these times, though not unrelated to it. At the moment it seemed wise to learn all we could about the influenza which was with us, hoping to be better prepared to deal with the arrival of its fearsome relation. Before the 1918 pandemic there were a number of signs and portents in the form of abnormal prevalences of respiratory infections. He did not know that anyone had detected any grave epidemiological omens recently, but he would be a rash man who indulged in prophecies, hopeful or gloomy.

At the meeting of the Tuberculosis Society of Scotland held in Glasgow on Oct. 23, with Dr. C. Cameron (president) in the chair, Honorary Membership was conferred upon Sir StClair Thomson, who afterwards gave a lecture on "Tuberculosis of the Larynx: Diagnosis and Prognostic Value," illustrated with a lantern demonstration.

Correspondence

Air Disinfection

SIR,—With reference to your annotation entitled "A New Method of Air Disinfection" (Oct. 10, p. 431) may I be permitted to add a few remarks. We are of opinion in these laboratories that fundamentally chemicals exert their lethal action on bacteria by the same mechanism, whether the field of activity is in the test-tube or in the air. In estimating values, however, phenol coefficient and water solubility are pre-eminent in the former field, while vapour pressure and diffusion coefficient are additional factors of importance in the latter. When a bactericide is being tested in the air, rate and duration of action are noted. The two are incompatible in our experience, which, as a matter of fact, fits in with theory.

A germicide with a high vapour pressure has a rapid but evanescent action, while one with a low vapour pressure is relatively sluggish, albeit durable in its action, the test-tube phenol coefficient often coming but little into the picture. Glycols are examples of the former type of substance and hexyl resorcinol of the latter, resorcinol being an intermediate type. We found (*J. Hyg.*, Camb., 1940, **40**, 320) propylene glycol to be about as potent in the air as was carbolic acid, hexyl resorcinol being some 200 times as potent. Robertson found that 1 g. of the glycol in 50,000,000 ml. of air had under optimum conditions an effect (not pronounced), while we have observed a definite effect of hexyl resorcinol in a concentration of mist of 1 g. in 100,000,000,000 ml., and of resorcinol in ten times this concentration. These phenols are thus definitely "somewhat more effective" than glycols, and the contrast between their behaviour in air and in water is apparently again "extreme"—a not "unfamiliar" observation by other workers besides ourselves. At Portslade it is not felt that "no light has yet been obtained on its mechanism," and it may be pointed out that some of the phenols, as used by us, are odourless, non-irritating, and so far as test animals are concerned non-toxic.

It has to be confessed that we have really no knowledge as to the minimum effects sufficing to control cross-infection of respiratory diseases. It is possible that long before an inability to grow on agar plates is evident the bacteria in question have been so damaged that they are unable to cause infection. The arbitrary standard we set ourselves of a 90 to 95% kill within 10 minutes may be valueless or, on the other hand, unnecessarily severe. It is for this reason that the relative merits of different bactericides cannot be assessed until they are subjected to field tests, bearing in mind that they must have, of course, a low host-parasite toxicity ratio and other essential characteristics.

As regards mechanism of action—i.e., whether acting in mist or in vapour form—the probable answer is that bactericides may be lethal in either form. Few who have studied the subject would doubt this. But the size and number of germicide units in the air govern the collision frequency with the bacterium, so that it should theoretically have contacted 25,000 times the amount of germicide molecularly dispersed than when dispersed as a stable mist consisting of 1 μ particles. Hence we see why bactericides of high vapour pressure kill quickly, whether originally dispersed as mists or vapours. A quick kill of necessity calls for the employment of a larger amount of germicide than does a slower kill, and the question arises as to how far durability is to be sacrificed for rapidity of action. For example, 1,000 mg. of resorcinol painted on the floor of a chamber of 1 m.^{3} capacity will sterilize the atmosphere of the test organism in half an hour, and even when there is free access of the air to the outside will continue to do so for weeks. On the other hand, 1 mg. if mechanically atomized or heat volatilized will sterilize in 15 minutes, but will have lost practically all its activity within half an hour. The surface area of evaporation is very large in the latter case, but the reservoir of supply is small. If the paint be used in conjunction with the mist, the rate and durability of kill are influenced in the direction dictated by theory. Finally, to consider solely resorcinol and propylene glycol: the choice lies between the use of 1 part of the former to kill in 15 minutes and 100 parts of the latter to kill in 5 minutes. Both procedures, including several others, are, in our opinion, "promising," but in these laboratories the glycols were discarded as germicide bases in favour of the phenols 4 years ago, and subsequent studies have strengthened our view of the apparent general superiority of the phenols.

I am, etc.,

Portslade Research Laboratories. C. C. TWORT.

Tuberculosis and Milk

SIR,—It is good to see Dr. C. O. Hawthorne again taking the field for pasteurized milk (Oct. 24, p. 494). Made with his usual graciousness his plea may carry conviction to hundreds of your readers and urge them to fresh efforts among their patients. Let them be wary, however, of a rebuff awaiting them. They may be told, and truly, that this summer pasteurized milk soured as quickly as the raw product. It was my own depressing experience to see a bottle of raw milk being taken to my grandchildren as their (pasteurized) supply "is so bad"! Taken up with the company responsible the fact emerged that the call-up of skilled workers meant inefficient processing of the milk and sterilization of the bottles. It was therefore of special interest to see in the Report on Tuberculosis in Wartime the recommendation that "specially skilled workers in pasteurization depots should be placed on the list of reserved occupations." Man-power is being saved by the new regulations concerning the delivery of milk. Should not equal attention be given to those who handle the milk before it reaches the retail distributors?

If confidence in pasteurization is once lost it will be regained with great difficulty. Dr. Hawthorne's medical missionaries should at least feel they "have their quarrel just" and that Government support is behind them. If the wartime situation does not allow an adequate supply of skilled workers for "processing," should we not ask for a stronger pronouncement from the Government concerning the necessity for home boiling?—I am, etc.,

Moor Park. ESTHER CARLING.

Hepatitis

SIR,—I have read with interest Dr. Philip Evans's report (Oct. 17, p. 446) of an epidemic of hepatitis. The condition of infectious jaundice is probably more prevalent in London than is realized but remains unrecognized, while more frequent reports come from country districts because the cases are not divided between many doctors.

I was called early in September of this year to see a girl aged 23 who was working as an assistant in a day nursery in the North of London. She had a temperature of 101° F. and signs of mild sore throat. For four days she was running a temperature between 100° and 101° F., with no other symptoms except nausea and occasional sickness, when she took veganin tablets. On the fourth day I found a slightly enlarged firm spleen; the next day she developed jaundice with biliuria and clay-coloured stools, which were, however, not quite free from bilirubin. Two days later the stool turned normal again; biliuria disappeared, but the urine was still rich in urobilin for the following week; jaundice of the skin grew a little more intense. The temperature dropped to about 99° F. when the jaundice appeared. The liver was considerably enlarged for a couple of weeks, but was never tender to touch. The agglutination test made 10 days after was negative for typhoid and paratyphoid fevers and for the salmonella group.

When I questioned the girl, who was quite intelligent, I learnt that a number of the children at the nursery had diarrhoea and in some of them she noticed pale stools, just as she had had. One child had developed jaundice. On further inquiry I was able to trace 3 more cases of jaundice from the nursery, which had been seen at the same period by a doctor. Probably more cases had no medical attendance at all. Another assistant at the day nursery, 18 years old, had to go to a hospital with pneumonia late in September. There she developed jaundice about a month after I had seen the other girl, this being quite a usual incubation period of this disease. She had pale yellow stools; later she developed granulocytopenia. The hospital doctor explained the jaundice as a toxic reaction to sulphapyridine treatment of the pneumonia. I am inclined to think the jaundice was an infectious hepatitis just coinciding with the pneumonia, and that severe leucopenic reaction was caused by the failure of the liver to "detoxicate" the drug. Though infectious jaundice generally takes a mild course it appears highly desirable that these cases should be made notifiable in view of the long convalescence, especially in adults. This outbreak was quite unknown to the medical officer attending the nursery.—I am, etc.,

London, W.9. F. MULLER.

Purpuric Type of Cerebrospinal Fever

SIR,—Dr. E. H. M. Milligan's letter (Oct. 3, p. 405) has called my attention to the earlier reference which he notes (Dr. I. S. Fox, Aug. 22, p. 218). Commenting on the case of fulminating purpura which he had described, Dr. Fox adds: "The illness is so fulminating and death occurs so early that complete investigation is generally not possible." Those who have had to deal with these tragic cases will readily endorse this.

There is one simple measure that I have never seen recorded which is worth doing because it may enable the diagnosis of massive bacteriaemia with meningococci to be made at once. During one of the most severe epidemics of cerebrospinal fever with which I had to deal and which occurred in Kunming, China, during the winter and spring of 1936-7, a child of 3 was brought to the hospital with an 8-hour history of severe fever. There was a moderately extensive purpuric rash, and a diagnosis of cerebrospinal fever of the purpuric type was confidently made. For some reason, in addition to a lumbar puncture, a blood film was taken and stained by the Romanowsky method. To our astonishment the film showed masses of meningococci. They were to be seen in every field clumped together in groups of 6 or 8 to some dozens. A number of other films were taken and all showed the same thing. During the course of the epidemic, although blood films were taken in cases without any purpuric rash, we were not fortunate in obtaining a similar positive result. Later, two further purpuric cases were seen, and in both of them meningococci were present in considerable numbers, though not as many as in the first case and they had to be searched for. All of these cases were fatal within 36 hours, and all were in young children.

At that time the sulphonamide drugs were only becoming known, and in the years 1938 and 1939, when Kunming was grossly overcrowded, scarlet fever and typhoid were the chief epidemics. Cerebrospinal meningitis was only met with sporadically, so that there was no opportunity to try the effect of massive doses of sulphapyridine (I left Kunming in July, 1939). I would suggest, therefore, that in any cases where there is a purpuric rash with high fever, and especially during an epidemic of cerebrospinal meningitis, blood films should be taken at once, stained by the Romanowsky or similar method, and examined for meningococci. In this kind of case every minute is valuable, and the sooner vigorous sulphapyridine treatment is instituted the greater the possibility of saving these desperately ill patients.—I am, etc.,

ALEXANDER J. WATSON, M.D., D.P.H.
Mildmay Mission Hospital, E.2.

Child Health

SIR,—Prof. Charles McNeil's review of 60 years' child health in Holland, Scotland, and England (April 4, p. 429), coupled with your leading article, prompts me to the expression of views that have long struggled for opportunity of outlet.

That "lack of knowledge on the part of doctors and nurses responsible for the welfare of infants before and after birth" is a root cause of our failure in this potentially fruitful field of medicine is undeniably true. Nor can one have anything but approval for Prof. McNeil's suggestions for the reorganization and emphasis on child health and welfare in our medical curricula. I would go further and add the following recommendations.

First, that the B.M.A., Ministry of Health, or some other responsible body with the necessary powers and facilities should appoint a medical committee to collect, collate, and co-ordinate the vast amount of knowledge we already possess on the subject of child health. On the basis of their recommendations the necessary changes required in medical education of medical students, nurses, health visitors, and child welfare workers could be carried out, and, in addition, some standardization of teaching and method could be adopted to counteract the present welter of confusion and contradiction between the advice meted out to the bewildered mother by her family doctor, health visitor, and clinic adviser. Secondly, that the co-operation of the Board of Education be invited and the advisability of including biology, elementary physiology, and hygiene in the teaching in all schools be urged. After all, it is ignorance in parents and grandparents that we ultimately wish to eradicate in addition to our own limitations as a profession. Only too often are our effort and advice frustrated by "grandma who had eleven children" (two of whom died in infancy).

Thirdly, it seems probable (indeed hopeful) that some form of State medicine will be evolved after the war. Surely the welfare of the child (and incidentally of the general practitioner) will best be served by bringing the better trained and educated G.P. into the public health or State-aided service as the child welfare clinic doctor. Even now the G.P. is no more ignorant of child health and infant welfare than the average assistant medical officer of health when he first takes over a baby clinic. Indeed, he is often much more capable of giving good practical advice, and if Prof. McNeil's proposals are adopted he will be even more so. The practitioner is thus being brought back in his rightful place as the family physician and first link in the chain of medical supervision. The child is getting that continuity of treatment and observation that is needed for the best results, and the very real conflict between clinic and doctor is avoided. The doctor would have the facilities of the public health service at his command, health visitors, and laboratory aids, and the service of a consultant paediatrician could also be incorporated. Furthermore, each G.P. could see infants of all his own patients without extra cost to the family, and large overcrowded child welfare clinics with their attendant dangers would be avoided.

I am convinced that our present system of child welfare clinics run by the local health authorities is not producing satisfactory results. I myself (in peacetime) frequently had baby clinics of 60, 70, and 80, numbers being only the least of their disadvantages. There is a tendency inherent in all such clinics either to give away or to sell at reduced prices various artificial baby foods, which is, in my opinion, reducing the amount of breast-feeding instead of increasing it. A high proportion of breast-feeding can only be achieved by close observation and help from a well-trusted adviser in the last month of pregnancy and the first month of infancy. This the clinic doctor in the present system does not and cannot give. But small clinics run by family practitioners who have had adequate training would do much to reduce child mortality and morbidity and lay the foundations of a healthier and, I hope, happier people. Finally, such a system would tend to offset the increasing absorption of members of the profession in purely or largely administrative work.—I am, etc.,

ERIC TOWNSEND,
Capt. R.A.M.C.
Egypt.

Loneliness in Infancy

SIR,—I was delighted to read Dr. D. W. Winnicott's letter (Oct. 17, p. 465) on loneliness in infancy. It is a matter that has been exercising my mind greatly during the past year or two, during which the exigencies of war have removed me from my psychotherapeutic (analytical) practice and have required me to live in a hotel in a "reception area."

My work as an analyst had convinced me of the enormous significance of emotional distress in very early infancy—distress usually the result of being alone and helpless and without reassurance in times of discomfort or wakefulness in a still alien world. This kind of experience I had uncovered in maladjusted adults and seen as the source of a fundamental sense of insecurity, of the feeling of "the world against me," and of the fear of feeling and impulse, which so often characterize the neurotic personality. At the hotel I saw again and again these foundations being laid, not as the result of a physical separation of mother and infant, but by young mothers themselves (wives of officers), bursting with anxious enthusiasm not to "spoil" their babies, and convinced that the one way to avoid such "spoiling" was to leave them alone and untended from one feed to the next, no matter how desperately they might cry, and to cut down all physical and social contact and play to a minimum.

I maintain that "lethal" is not too strong a word to apply to such treatment, and lethal it has probably literally been in those not so rare cases of the baby found dead in its cot or pram, having, one surmises, cried itself sick and choked on its own vomit. But to keep to the psychological point of view, damage must result from such unnatural treatment. These infants (1) are left to deal alone and without reassurance with mounting rage and fear, which become beyond their power to control; (2) suffer too much deprivation and restriction

of normal impulses; (3) are allowed no scope for the development of the first personal relationship with the mother, for which, as the late Dr. Ian Suttie has shown (*Origins of Love and Hate*, 1935), there is an inherent instinct in the infant and which lays the foundation of all future personal relationships.

The consequences of the first and second injuries (too great a demand and too much deprivation) are the development of (*a*) fear of feeling, inhibiting later emotional growth, and (*b*) excessive cravings or (if over-repression has had to be invoked to escape the intolerable situation) inhibition of normal impulses and a turning inwards instead of outwards for sources of satisfaction. The baby with finger or thumb in its mouth and the other hand fingering the hair or an ear is a characteristic result, and to my mind already reveals in these gestures the signs of future neurosis or maladjustment. The result of the third injury is a failure to lay sound foundations for future personal relationships, and the production of either a mother-fixed (excessive craving again) or an isolated personality incapable of deep outgoing affection.

What perplexes me is the anxiety of these young mothers, and the almost sadistic infliction of their maternity-nurse-derived principles on their defenceless babies. Is it that they themselves are the product of similar infant care and, as a result, lack the passionate impulses of love and compassion towards their babies which seem natural to the older generation of mothers? Victorian mothers cuddled their babies and demanded correct behaviour from their older children. Modern mothers are anxiously cold and remote in the handling of their babies and let their older children run amuck. Which method produces the better adult? Is there a connexion between world-wide war and the newer methods of baby culture?—I am, etc.,

Wem. LAURA HUTTON.

Breast-feeding

SIR,—Dr. J. Gordon Mathias (Oct. 17, p. 465) says: "If Nature intended women to feed their young successfully, then they should adopt a more reasonable attitude and go on all fours"; and he asks: "Could there be a more awkward position for the suckling babe than the arm of its mother to sit on and a large breast to hold on to?" Hospital practice is to insist on the mother sitting up to suckle her child, and handbooks for mothers also recommend this as the method of choice. It is left for the mother to find out for herself sooner or later that it is much easier and more comfortable to lie at full length, with the infant lying beside her. Apart from the gain in comfort and convenience, this position also ensures regular rest periods, of which the nursing mother is much in need. Greater emphasis to mothers and to their relations on this need for rest might help to tide women over the special danger period for lactation—the few days after they get about again. The food and vitamin supply and the hygienic conditions of lactating women require as much consideration as those of pregnant women both from their doctors and from the general public. Prof. Charles McNeil, in his excellent alphabet of breast-feeding (Sept. 5, p. 271), claims the economy of the national milk supply as a special reason for encouraging breast-feeding. He forgets that at least 2 pints of cow's milk, or their equivalent in calcium, protein, etc., are probably required by the woman for each pint of milk secreted, as is recognized to some extent by the Ministry of Food in allowing 2 pints of milk daily for infants under 1 year and extra supplies of eggs also. Recent work indicates a raised requirement of vitamin B during lactation, which should be remembered as well as the commonly stressed need for vitamins A, D, and C.

Dr. Mathias appears to resent the possibility that mothers and babies may enjoy the process of suckling. Surely the fact that it is enjoyable should be emphasized, and the new-made mother should not be left unaware that to suckle her baby is, as Dr. Violet Russell says (Sept. 26, p. 377), "a pleasure and not an irksome duty."

I should like to emphasize Prof. McNeil's teaching that scanty lactation should be treated by shorter intervals between feeds. Too many mothers, nurses, and doctors regard the 4-hourly interval as sacred. Dr. Violet Russell urges the relaxation of the rules of regular feeding during the establishment of lactation, and the same relaxation is necessary if the milk supply falls off. A baby can be put on to 3-hourly or even 2-hourly feeds for a few days, and will return without any difficulty to 4-hourly feeds as the milk supply rises. I have known babies weaned, on medical advice, at the age of 2 or 3 weeks on the ground of "lack of milk," when suckling had been carried out only at 4-hourly intervals and on only one breast at each feed. Very few women could lactate with this inadequate stimulus. I certainly could not myself, though I have successfully suckled 5 babies up to the age of 10 or 12 months. The failure of mothers to breast-feed their babies is often associated with the doctor's advice to wean the baby. It is to be hoped that Prof. McNeil's alphabet of breast-feeding will help many doctors to give other advice.—I am, etc.,

DOCTOR'S WIFE.

Treatment of Malaria

SIR,—I was glad to see that Prof. Warrington Yorke (Aug. 8, p. 167) disagreed with Sir Rickard Christophers's sweeping assertions regarding intramuscular injections of quinine at the meeting of the Royal Society of Tropical Medicine on July 23. At the African Hospital here, with over 300 beds and an average out-patient attendance of 260, between 30 and 50 intramuscular injections of quinine are given daily and we have not seen the terrifying results he mentions. The quinine solution is prepared locally. We have found that it shortens the course of the malarial attack and is a great saving in quinine—6 gr. daily as opposed to 30 gr. in an adult. We always give an injection of atebrin to blackwater fever cases on admission and to patients with malaria who have previously had blackwater fever, and we have never had cause to regret it.—I am, etc.,

R. N. HALL,
Nigeria. Medical Officer i/c City Hospital, Kano.

Dressing for Thiersch Grafts

SIR,—The following method of dressing Thiersch grafts may be of interest. Over the grafted area a piece of sponge rubber 3/4 in. thick is applied directly and fixed in position by means of parallel 1/2-in. strips of elastoplast spaced at intervals of about an inch so that light even pressure is secured. The sponge rubber is previously cut into a square or rectangle allowing about 1/2 in. overlap, and the corners and sharp edges are trimmed off with scissors. It is sterilized by boiling and the excess water squeezed out. No other dressing is applied and the part is left exposed to the air, if necessary under a cradle to prevent contact with bedclothes. The dressing is not interfered with for about 10 to 14 days unless there is a foul smell or excessive discharge around the edges. On removal complete healing is the rule. Even when mild sepsis occurred, which is difficult to prevent in a small proportion of cases when working under semi-tropical conditions, the grafts "took" well and often completely. While no originality is claimed for the details of this method, I have found it give far more satisfactory results than any of the other methods which were tried. The sponge rubber was obtained in sheets from the Dunlop Rubber Company, Bombay.—I am, etc.,

F. V. STONHAM,
Major, I.M.S.

Scabies

SIR,—What is a "standard treatment"? Dr. G. H. Percival,[1] in his interesting article on the cure of scabies, criticizes my colleagues and myself for calling a course of three applications of sulphur ointment the "standard treatment"; he states that the standard treatment is one of six inunctions, and as his authority cites the publication by Walker and Percival.[2] We based our expression "standard treatment" on the advice given in the circulars on scabies officially published by the Ministry of Health and on the directions given in many reliable textbooks of dermatology. I am sure that all those concerned with the treatment of scabies would pay full attention to the carefully considered suggestions of writers of the calibre of Walker and Percival, but for Dr. Percival to state that a treatment becomes a standard one because he has published an article containing the suggestion is an assumption to which few others would aspire. Incidentally it has repeatedly been shown

1 Percival, G. H. (1942). *British Medical Journal*, **2**, 451.
2 Walker, Sir N., and Percival, G. H. (1939). *Introduction to Dermatology*, 10th ed., Edinburgh.

that with proper supervision even untrained personnel will cure very nearly 100% of cases of scabies with three inunctions of sulphur ointment, and even one application has been found by the health department of one of our larger cities to cure 90% of cases. To give six inunctions is a gross waste of medicaments and of man-power.

The advisability or not of disinfesting clothing, etc., is a question which is apt to become somewhat confused. I think that my experiments have shown that infection from inanimate objects, while occasionally possible, is unlikely to be one of the commoner ways of contracting scabies.[3] This does not directly affect the issue concerning disinfesting the belongings of patients known to be suffering from scabies. After adequate treatment with benzyl benzoate emulsion I have shown that the body is covered for at least twelve hours with an acaricidal film which will serve as an efficient disinfestor. If clothing and blankets do not often infect the normal body they are even less likely to reinfect a properly treated patient, and a painting with benzyl benzoate might be used prophylactically by anyone who is compelled to share a bed with a case of scabies. If Gordon and Seaton[4] had put a little benzyl benzoate on their rats' tails before applying the infested cloths they would have obtained a different result.

Dr. Percival alleges that in 1941 I advocated the omission of disinfestation but had more recently modified my views. Actually in 1941 I suggested that disinfestation might possibly be dispensed with but that further work was needed to clarify the issue. That work has now been done by a multitude of progressive medical officers of health and others. In a number of areas where the standards of diagnosis and treatment are high, disinfestation has been dispensed with without any deterioration in the results. Practical experience has shown that any possible increase in relapse rate (if this exists it is certainly under 1%) is fully offset by the great economy. In areas where contrary results have been obtained the fault has usually been attributable to bad diagnosis, as conditions other than scabies have been given incorrect treatment, with an unsatisfactory so-called relapse rate for "scabies."

Dr. Percival suggests that no technique is likely to be successful in 100% of cases This implies that sarcoptes is more difficult to kill in some patients than in others. With this view I completely disagree. I have found nothing to suggest that these parasites behave differently in different patients, and two, or at most three, applications of either sulphur ointment or benzyl benzoate, if properly used, will kill every parasite in every case of scabies. Even one application of benzyl benzoate emulsion will kill over 99% of the parasites. The lesions produced by scratching and secondary infection will, however, show considerable variation in their reaction to treatment, and their persistence often gives rise to the erroneous view that the scabies is still uncured. Incidentally, even if I found no live parasites after treatment I should not be entirely satisfied with a new method if I could only observe the patients for a fortnight. As with other parasites there is a great "wastage" with sarcoptes, and a month or six weeks may elapse before the mite population regenerates sufficiently to be easily recognizable.—I am, etc.,

Sorby Research Institute, Sheffield. KENNETH MELLANBY.

Prevention of Scabies

SIR,—The fact that the scabies epidemic continues almost unchecked in spite of weekly articles in the *B.M.J.* shows that there is something lacking in our approach. We still think of disease in terms of cure rather than prevention, and when we do consider prevention it is along the stereotyped line of catching cases early and inspecting all contacts. Our prevention does not begin until a family has actually got scabies; but to be effective we must start before that.

Scabies is very much commoner among the poor than the rich. If we could find out what gives the latter their relative immunity we should have gone a long way towards stamping out the disease. I was taught that scabies is not caught by shaking hands with people but by sleeping with them, the implication being that it is aetiologically akin to the venereal diseases. What my teachers failed to realize is that double beds are the rule in working-class homes, so that if one of the boys gets scabies his brother is sure to get it too. Many women dislike sleeping alone, and when their husbands are fire-watching they go to a friend's house, sleep with the wife, and put their children into bed with her children. Richer people do not do that; if they joined forces with another family they would all sleep in separate beds, and if these were not available they would consider their house full and not take in visitors.

Customs vary, and it would hardly be considered proper for the adjutant of a battalion to sleep with the second in command, but that would not have been at all strange in Elizabethan times, and Iago quite casually told Othello that he "lay with Cassio lately." Nor is it at all unusual to-day for working-men to share a bed. Recently I saw two civilians, strangers to each other, compulsorily billeted in Norwich and sharing a bed, both of whom had scabies, caught, as each supposed, from the other. The wealthier classes make a habit of taking off all their underclothes when they undress at night, but manual workers and their families usually put their pyjamas over their vests. That is a custom which can easily be changed; I find people are quite ready to accept the idea once it is put to them. Personal hygiene and social custom are the most important factors in the aetiology of scabies, and it is not good medicine to ignore them.—I am, etc.,

Norwich. FREWEN MOOR.

Treatment of Impetigo

SIR,—The article on wartime dermatology by Surg. Lieut. R. Workman Carslaw (Oct. 10, p. 420) again stresses the importance of discarding ointments wherever possible in order to conserve fats, and quotes Dr. R. T. Brain (Oct. 4, 1941, p. 492) that an ointment in the treatment of impetigo is inadvisable, as a film of grease retains exudates and sweat, which encourage the growth of organisms and irritate the follicles.

Having tried various time-honoured remedies—e.g., removal of scabs with olive oil or fomentations followed by ung. hydrarg. ammon. dil.—for impetigo, especially in children, with indifferent success, I have in the last few months treated a large number of cases by the method advocated by Lieut.-Col. J. H. Smith (Nov. 1, 1941, p. 640)—the application of liq. ferri perchlor. fortis without previous removal of scabs—and the results have been excellent. The spread of the infection has been stopped and the period of infectivity has been shortened very considerably. The action of the solution is that of an antiseptic and powerful astringent, coagulating albuminous fluids. It has no action on the unbroken skin and is non-poisonous to living matter (Hale White, *Materia Medica and Therapeutics*, 1942).

The advantages are simplicity of application—the treatment can be left in the hands of the patient—cheapness, and it avoids the waste in fats. The disadvantage is that the solution is painful on application and rather contraindicated for very young children. For these I have used 2% aqueous gentian violet as recommended by Dr. G. A. Grant Peterkin (Sept. 20, 1941, p. 422), but the treatment is more prolonged and the solution is mainly effective in the dry scaly stage. I have also used the liq. ferri perchlor. fortis solution in intractable cases of infantile eczema with very good results.

At a time when conservation of raw materials is so essential I would urge a wider application of this treatment in impetigo and the abandonment of the ointments so commonly used. —I am, etc.,

Newcastle, Staffs. C. SIMPSON SMITH.

Classification of Nerve Injuries

SIR,—Lest he should rejoice too much I must point out that Dr. Walshe was included among the three unnamed complainants mentioned in my reply to Dr. Russell Brain; he was kind enough to write to me at great length when I was trying to make up my mind about these names for nerve injuries. If numbers meant anything I could dilate on the more numerous favourable letters that I have received, chiefly from medical officers in the Services who send patients here. These men, like myself, are more interested in clinical work than in laying waste your valuable space with verbal casuistry, and they discussed the classification and its clinical application rather than the three new words—or neologisms, as Dr. Walshe,

[3] Mellanby, K. (1941). *British Medical Journal*, **2**, 405.
[4] Gordon and Seaton (1941). *Ann. trop. Med. Parasit.*, **35**, 2.

oddly enough, prefers to call them. The three types could have been labelled "A," "B," and "C," like the vitamins (and combined lesions would have been represented with engaging simplicity by combinations of these letters); but I thought, and still think, that, after the confusion that has prevailed for so long in the nomenclature of nerve injuries, "neurotmesis," "axonotmesis," and "neurapraxia" were rather better in that they were descriptive and reasonably accurate. It is to be noted that Dr. Walshe, even though he commands "the illimitable resources of our mother tongue," suggests no alternative names to cover all the conditions we are considering.

It is good of him to mention "fibrin suture," for the use of this term shows that one does not use new words just for the fun of the thing, but only when they are needed. "Suture" is a fairly elastic word; anatomists, botanists, and zoologists use it for unions in which stitches play no part, and the significance of stitches in the surgical definition is no more than an indication that until recent times stitches were the only available means of joining sundered tissues. Its use in "fibrin suture" is as plain as a pikestaff; one does with a fibrin clot what is usually done with stitches, so why invent a new word? As for being a terminological purist—I can make so such claim; for one thing, I never learned Greek. But like those who invented the words "telephone," "microphone," megaphone," and "loud-speaker," I want a name for a thing, and surely it is no offence if the term happens to be etymologically correct.

If Dr. Walshe reads again Weir Mitchell's case records he will find descriptions of all three basic types of nerve injury, but Weir Mitchell was denied the facilities we enjoy for direct examination of damaged nerves and he never essayed an unequivocal classification or gave names to the lesions. However, he did describe a striking clinical phenomenon and, Dr. Walshe not being there to stop him, called it by a Greek name, "causalgia." Weir Mitchell is remembered chiefly for this, and perhaps his work on ordinary nerve injuries would be better known had he made the classification that was almost within his grasp and christened the three types. It might have prevented the lamentable confusion that followed.

It is never too late to mend, and here is a classification which I believe to be fairly accurate and is undoubtedly useful; Dr. Walshe assails it only because the nomenclature is Greek, a language to which he is notoriously allergic. I am quite unrepentant, and am encouraged to be so by his choice of hudinage rather than reason as his weapon.—I am, etc.,

Wingfield-Morris Orthopaedic Hospital, Oxford. H. J. Seddon.

Working for a Salary

Sir,—Dr. H. G. Calwell (Oct. 17, p. 464), in his disagreement with Sir Beckwith Whitehouse's statement, quotes a series of pioneers who have achieved notable progress in spite of working for a fixed salary. A striking similarity in all the examples quoted by Dr. Calwell is that they were working in tropical diseases, presumably in places far from the distractions of civilization as found in our large cities, and that they were mostly no ordinary men, but of a type calculated to "come out strong" in any circumstances, so that I maintain that they provide the exceptions to Sir Beckwith Whitehouse's rule, and do not disprove it, as a series of examples from our public health and municipal hospital services might have done.

In my own experience of municipal hospital work in two big cities I have both felt the onset of mental sloth and stultification of effort indicated by Sir B. Whitehouse, and have seen men of promise enter the service and noted their deterioration into routine workers of mediocre performance and excessive outside interests. Observing this tendency in myself I hastily abandoned the security of a salary of fixed limits, a pension, and a "dead-end" job, and returned to voluntary hospital work, amid the derision of my late colleagues. It required an effort, which has since proved well worth the making, since I have just acquired an appointment in my specialty with facilities for teaching and research which I should not have obtained had I remained in the municipal service. The vast majority of us are all too easily influenced by environment, and should, therefore, seek out that which stimulates our efforts, which in most cases will not be found in the fixed-salary positions.—I am, etc.,

Preston. Una M. Westell.

The Profession and the Services

Sir,—One feature of the "calling-up" of medical men for the Services, which has, as yet, excited little or no comment, is that affecting the voluntary hospitals. Many young surgeons working in these institutions have now been called up. I do not know the actual numbers involved, but in one hospital I know of four out of a staff of five general surgeons are now in the Services, and so far as one can judge their surgical work there is not, to put it mildly, arduous.

It would not appear that such a system is in the best interests of either the surgeons, their future patients, or the general public. As a team surgeon in the last war, I have a very lively recollection of the fine organization in the R.A.M.C. of that time, when mobile surgical teams were formed, each consisting of a surgeon, an anaesthetist, a theatre sister, and two R.A.M.C. orderlies. These teams continued work at their own hospitals and became familiar with each other's methods, etc., and were ready to proceed to any "sector" of the front where and when their services were required.

The advantages of such an organization are so obvious that one wonders why it should not have been applied, in principle at least, to the present situation.—I am, etc.,

George McMullan.

Medical Planning Now

Sir,—I have just read Mr. H. J. McCurrich's letter (Oct. 24, p. 498). No sensible man has any illusions about politicians, but up to now it would seem that a great many of our profession have not realized and do not realize the urgent need for the doctors to go ahead with their plannings now. They have not realized that there is no choice between the present state of affairs and State medical services: the latter are already here. One has only to see the large number of well-equipped new county hospitals which have sprung up in the last few years, and the large number of county medical officers and clinics. No, the only choice we have is this: are the politicians going to run the medical services or are the medical profession? We should begin now to find men, medically qualified, to be trained in administrative work. Doctors are the only people who can understand doctors' problems, but they should be properly trained. It is no good putting a man into an administrative post merely because he thinks he would like to "have a stab at administrative work" and feels that is his *métier*.

The medical profession seem to have forgotten the lesson they should have learned when National Health Insurance was first brought in. I sincerely hope that there will be a great many more McCurrichs to see where the real question lies and what the real danger is.—I am, etc.,

Ledbury. Geoffrey G. Airey.

The Services

The King has made the following awards in recognition of gallant and distinguished services in Burma during the period Dec., 1941, to May, 1942:

C.B.E. (Military Division): Temp. Brigadier T. O. Thompson, late R.A.M.C.

O.B.E. (Military Division): Lieut.-Col. F. Oppenheimer, I.M.S.

D.S.O.: Temp. Col. G. E. MacAlevey, M.C., R.A.M.C., Capt. C. W. Elphick, R.A.M.C.

M.C.: Capt. H. O'Hara, R.A.M.C.

Mentions in Dispatches: Acting Col. J. Taylor, O.B.E., Major (Acting Lieut.-Col.) W. F. Lane, Major S. O. Bramwell, Capt. (Temp. Major) A. J. Martin, Capt. (Acting Major) M. S. Holman, and Capts. O. W. W. Clarke, P. W. Dill-Russell, A. P. Hick, R.A.M.C.; Acting Col. G. M. Moffatt, O.B.E., Majors (Temp. Lieut.-Cols.) C. S. Gamble and H. B. MacEvoy, Majors (Acting Lieut.-Cols.) A. E. Kingston and P. L. O'Neill, Major D. F. Eastcott, Capts. N. Ahmad, N. K. Mitra, and S. M. Basu, and Lieuts. A. Krishaswamy, G. M. Diwan, and R. S. Rao, I.M.S.; Assistant Surgeons F. J. Burby, C. E. Watts, and D. J. R. Snow, I.M.D.; Capt. S. M. Paw and Lieut. M. Nag, Burma Reserve of Officers.

CASUALTIES IN THE MEDICAL SERVICES

Wounded.—Acting Lieut.-Col. A. W. Gardner, R.A.M.C., Capt. N. J. P. Hewlings, R.A.M.C., War Subs. Capt. T. A. Shannon, R.A.M.C.

Prisoners of War.—Major L. Feinhols, I.M.S., Acting Lieut.-Col. M. R. Sinclair, O.B.E., I.M.S.

Missing.—Assistant Surg. A. R. Coshan, I.M.D.

Obituary

We regret to announce the sudden death on Sept. 30 at Dunham Massey, Cheshire, of Mr. FRANK HOLT DIGGLE, F.R.C.S., surgeon-in-charge of the ear, nose, and throat department of Ancoats Hospital, Manchester, and laryngologist to the Christie Hospital and Holt Radium Institute. Born at Heywood, Lancs, in May, 1886, he was educated at Rossall School and had a successful student career at Manchester, winning two scholarships and the prize in clinical medicine. He graduated M.B., Ch.B. (with honours) of Victoria University in 1909, and after resident posts at the Manchester Royal Infirmary and further surgical study in London obtained the Fellowship of the Royal Colleges of Surgeons of England and of Edinburgh in 1913. During the last war he served with the rank of captain R.A.M.C., and was surgical specialist to two casualty clearing stations. For his war service Holt Diggle was made O.B.E. in 1919. After returning to civil practice he was for a short time on the staff of the Birmingham and Midland Ear and Throat Hospital, and then went back to Manchester as surgeon to the Manchester Ear Hospital and aurist and laryngologist to Ancoats Hospital and the Manchester Union Hospitals. Later he became lecturer in applied physiology at the University. He was also laryngologist to the Royal School of Music in Manchester and to the Duchess of York Hospital for Babies. He joined the British Medical Association in 1921 and was secretary of the Section of Oto-rhino-laryngology at the Manchester Meeting of 1929, and published a number of papers on his specialty in these columns and elsewhere.

Dr. GEORGE SMITH of Donaghadee, Co. Down, died in Ards District Hospital on Sept. 2 after a short illness. The elder son of Mr. E. C. Smith of Islandmagee, chairman of Antrim County Council, he was educated at Sedbergh and had farmed for some years on an extensive scale before entering the Queen's University of Belfast in 1922. He graduated M.B., B.Ch. in 1927 and held resident posts at the Royal Victoria Hospital and several other institutions. He proceeded M.D., B.Sc., D.P.H., and was for some time in the school medical services of Down Regional Committee. Since 1936 Dr. Smith had established an excellent practice in Donaghadee, and in addition was medical officer to the infectious diseases block of Ards District Hospital. In these spheres he was greatly beloved and esteemed by all with whom he came in contact. His untimely death in his 43rd year is deeply regretted, and warm sympathy is extended to his widow and two young children.

Dr. HENRY WILLINGHAM GELL, O.B.E., of Church Aston Manor, Newport, Shropshire, died on Sept. 14 in his 86th year. His father was the Rev. J. P. Gell and his maternal grandfather was Sir John Franklin, the Arctic explorer. After obtaining his degree at Balliol College, Oxford, he entered St. Bartholomew's Hospital and qualified M.R.C.S. in 1885, taking the M.B. a year later. He then embarked on what eventually became a large practice in the West End of London, living in Hyde Park Square. In his earlier years Dr. Gell took a prominent part in the work of the National Health Society, both as lecturer and examiner, and wrote a popular little book, *Aids to the Injured and Sick*. He was for some time vice-chairman of the Paddington Board of Guardians and served for many years on the Metropolitan Asylums Board, presiding over many of its committees, more particularly the Ambulance Committee, where he took an active part in inaugurating the first motor ambulance service for the Metropolis. After his retirement from practice he went to live at Woolhampton Court, Berkshire. During the last war he gave voluntary service to the Reading War Hospital, for which he received the O.B.E.; towards the close of the war he undertook the treasurership of that hospital and set to work to inaugurate one of the earliest of the contributory schemes. Dr. Gell had been a member of the B.M.A. for 57 years.

We regret to announce the death of Dr. WILLIAM J. CANDLISH of Bulwell on Sept. 18. Born at Birkenhead in 1886 he was educated at Bolton School and studied medicine at Edinburgh University. He had a distinguished career as a student, winning the medals for anatomy and pathology and the Wightman scholarship in clinical medicine. He qualified in 1912. After holding the resident post of casualty officer at Leicester Royal Infirmary and doing an assistantship he went to Bulwell, Nottingham, in March, 1914. During the last war he volunteered three times for the R.A.M.C. He was twice rejected; the third time he was accepted but was deemed indispensable. During this period he was carrying on a three-man practice single-handed and also acting as civilian medical officer to the troops stationed at Bulwell Hall, and latterly to the cadets of the Nottingham University O.T.C. Dr. Candlish was appointed medical officer to Basford Infirmary in 1919, and during a long association with that institution assisted its development into a modern hospital. For many years he served on the Nottingham Panel Committee and was a member of the Medical Chirurgical Society, of the North of England Obstetrical Society, and of the British Medical Association. He was for many years an examiner to the General Nursing Council and medical officer to the Post Office. In 1939 he was appointed chairman to the Nottingham Medical Recruiting Board, a position he held at the time of his death. Candlish (writing H. J. M.) was one of those men whose capacity for work surprised everyone, and his enthusiasm was an inspiration to all. He ran a large general practice, and for years had allowed himself little time for leisure. Since his appointment as medical officer-in-charge of the Basford County Hospital he watched the development from chronic to more acute work, taking a particular interest in the emergency obstetric side. His interest in this branch of the work led him to take the Edinburgh M.D. at the age of 48, and three years later the Diploma of the Royal College of Obstetricians and Gynaecologists. He was a man appreciated not only for his skill but for his straightforwardness, kindliness, and tact—one had only to walk into the hospital to recognize at once that the right atmosphere was there. In consequence of this atmosphere the staff was with him heart and soul, and one realized that here was the right man in the right job. In his general practice, too, one felt immediately that the welfare of the patients always came first and it was this will to serve to which he subordinated all else which eventually proved too much and precipitated his final illness. He will be sadly missed by a very large circle of friends.

After 58 years of active medical service Dr. GEORGE AUGUSTUS EDWARD ROBERTS died at Twyford, Hants, on Oct. 6, 1942, aged 80. Born on Feb. 2, 1862, at Ashley, Staffs, son of Dr. Thomas Roberts, he qualified at the Middlesex Hospital L.S.A. 1884, M.R.C.S. 1885, and D.P.H. 1897. After serving as house-surgeon to the Royal South Hants and Southampton Hospital he succeeded his father in practice at Twyford in 1887 and became M.O. to Winchester Guardians Committee. He was appointed M.O.H. to the Winchester Rural District Council in 1895 and held this post till Sept. 30, 1942—nearly 48 years. Largely owing to his efforts the Diamond Jubilee Hospital at Winchester, of which he was in charge, was built, and later the small-pox hospital. Dr. Roberts had been a member of the B.M.A. since 1887, and was also a member of the Society of Medical Officers of Health. He acted as honorary secretary of the Hampshire Local Medical and Panel Committees from 1912 to Dec., 1941, and for some years was a member of the Hampshire Insurance Committee. He published two papers in these columns: "Lead Poisoning from Home-made Wines" (1894) and "Lead Poisoning from Electrolysis of Water Pipes" (1906). Of wide experience, great kindliness, and sound judgment, he was always abreast of the times. A pioneer motorist in 1897 he drove till the year of his death. He began to use his own *x*-ray apparatus before the Boer War, and radium in 1909. He was also an early wireless enthusiast and held one of the first transmitting licences. A keen fisherman, none could tie a better fly; an amateur mechanic of no mean ability; all that came his way he took in his stride. When this war broke out, in spite of his advancing years, he was M.O. i/c of Casualty Services. He served to the end. He leaves a daughter and two sons, both doctors.

Dr. WALTER TYRRELL BROOKS, who died in retirement at Swanage on Oct. 14, had been for many years a leading practitioner at Oxford, where he was physician to the Radcliffe Infirmary and for some time Litchfield lecturer in medicine. He was born in London on Oct. 25, 1859, and from King's College School went up to Christ Church and graduated M.A.Oxon. He studied medicine at King's College Hospital, taking the M.R.C.S. and L.S.A. in 1882, and the M.B.Lond. with honours in medicine after winning scholarships at King's and holding a demonstratorship in physiology and anatomy. During the last war he served as officer-in-charge of the medical division of the 3rd Southern General Hospital with the rank of lieut.-colonel R.A.M.C.(T.F.). Dr. Brooks was for some time medical officer to Radley College, coroner for the University of Oxford, and administrator of the Orthopaedic Hospital at Headington. He was a member of the British Medical Association for many years and chairman of the Oxfordshire Insurance Committee in 1926-8. At the Annual Meeting of the B.M.A. at Bristol in 1894 he was honorary secretary of the Section of Medicine and its president at Oxford ten years later.

Universities and Colleges

UNIVERSITY OF OXFORD

In a Congregation, held on Oct. 15, the following degrees were conferred:

D.M.—*M. W. C. Oldfield.

B.M., B.Ch.—M. G. Ellis, W. E. Hunt, D. S. Goldfoot, *L. J. Bussell, *W. H. H. Andrews, *R. E. B. Tagart.

*In absence.

An additional examination in medicine, surgery, and midwifery for the degrees of B.M., B.Ch. will be held at the end of March, 1943.

UNIVERSITY OF LONDON

It was reported at a meeting of the Senate, held on Oct. 28, that Sir Girling Ball had been elected Dean of the Faculty of Medicine for the period 1942-4.

UNIVERSITY OF EDINBURGH

On Oct. 23 Prof. J. H. Gaddum, Sc.D., M.R.C.S., successor to the late Prof. A. J. Clark in the Chair of Materia Medica, gave his inaugural lecture. The Principal of the University, Sir Thomas Holland, welcoming the new professor, remarked that he was the third in succession who had come from the Chair of Pharmacology in London University. Prof. Gaddum's subject was "The Development of Materia Medica in Edinburgh," and he devoted the first part of his lecture to an account of the work of all the holders of the chair from the time when it was separated from the Chair of Botany in 1768. He concluded by stressing the importance of the modern science of pharmacology to the student of medicine, who must understand the language of the laboratories well enough to get full benefit from the discoveries that were coming from them.

UNIVERSITY OF GLASGOW

At a graduation ceremony on Oct. 24 the following medical degrees were conferred:

M.B., Ch.B.—*Douglas Jamieson, †N. R. Grist, †Zoé McF. Mackie, *L. H. Holroyd, †Edith E. Little, †Mary S. W. McCallum, †Jean A. Gibson, Jane E. Allan, W. M. Allan, A. Anderson, F. A. Ayles, J. T. Baird, Agnes D. Barr, J. Beattie, G. A. Bell, J. C. Beveridge, W. H. Black, T. A. S. Boyd, D. Brash, Annie C. Brown, J. K. Brown, W. McK. Brown, A. S. Browne, Anne H. Bruce, J. T. S. Buchan, R. A. Burnett, A. A. Clark, D. Clark, G. L. Clark, J. Colquhoun, W. M. Connell, A. H. Cook, N. R. Cowan, R. Dickie, Mary C. Fee, Margaret S. Ferguson, R. S. Ferguson, W. G. Ferguson, O. A. Finn, C. R. Forrest, A. Foster, C. C. Fowler, A. Fraser, C. Freed, T. Graham, T. E. Graham, Anne C. V. Greig, A. Grierson, J. McI. Hendry, R. K. Hinshalwood, Jean T. Holland, A. Hughes, T. Jack, J. R. Kenyon, Mary M. Kirkland, R. Lamb, Joan B. Landsman, Lilian Links, S. K. Livingston, D. F. McAlpine, Sarah Macaskill, A. K. McAusland, I. B. McBean, J. D. McCardel, H. R. F. Macdonald, J. A. Macfarlane, G. McHugh, A. B. MacLean, C. D. T. MacLean, H. I. MacLean, J. S. McLintock, J. McMillan, Violet C. I. Macnab, I. MacPhail, J. McSevich, W. S. Magowan, R. G. Main, W. G. Manderson, Margaret H. E. Martyn, Marjory B. Miller, J. G. Muir, W. J. Murphy, C. Naysmith, A. S. Nicolson, C. B. Noble, Ellen O'Hagan, F. O'Reilly, T. M. Paterson, Helen B. Phillips, Marie H. I. Reid, A. McQ. Robertson, E. McO. Robertson, J. A. M. Robertson, Constance A. C. Ross, J. S. Scobbie, J. K. Scott, G. B. Shaw, N. Shieff, R. W. Simpson, J. Smith, A. McG. Stevenson, G. T. Stewart, M. L. Thomson, R. M. Thomson, A. Tomney, E. W. N. Trounson, Barbara C. Tulloch, A. K. Turnbull, R. R. Waddell, Alison C. Wallace, J. M. Wallace, W. S. Wallace, R. G. Whitelaw, M. M. Whittet, A. H. L. Wilson, I. R. Wilson, W. S. Wilson, A. P. Wright, H. B. Young, I. S. Young, S. Young.

*With honours. †With commendation.

D. Jamieson gained (*a*) the Brunton Memorial Prize as the most distinguished graduate in medicine of 1942; (*b*) the West of Scotland R.A.M.C. Memorial Prize for the highest aggregate marks in surgery, medicine, and midwifery in the Final M.B., Ch.B. examinations in 1942; (*c*) the Macewen Medal in Surgery for the highest aggregate marks in surgery in the Final examinations in 1942; and (*d*) the Stockman Medal for the highest aggregate marks in the professional examinations in materia medica and therapeutics and in medicine, excluding paediatrics, of 1942.

The Struthers Medal and Prize were awarded to Eldred W. Walls for the best original research or the best dissections or preparations relating to any part of anatomy.

W. G. Manderson gained the John W. Weir Prize for the highest aggregate marks in midwifery and diseases of women in the final degree examinations in medicine held during 1942.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH

At the annual meeting of the College, held on Oct. 21, the following officers were elected for the ensuing year: *President*, Mr. J. W. Struthers. *Vice-President*, Dr. H. M. Traquair. *Secretary and Treasurer*, Mr. K. Paterson Brown. *Representative on General Medical Council*, Mr. Alex Miles. *Convener of Museum Committee*, Mr. W. Quarry Wood. *Librarian*, Dr. Douglas Guthrie.

CONJOINT BOARD IN SCOTLAND

The following candidates, having passed the final examinations, have been admitted L.R.C.P.Ed., L.R.C.S.Ed., L.R.F.P.&S.Glas.:

R. W. Adam, J. F. Allan, H. A. Anderson, A. G. Annan, S. W. Bowden, W. H. N. Calwell, W. Candib, Y. N. Carayannopoulos, T. A. Christie, J. F. Couch, G. L. K. Crampton, D. V. Curran, G. H. Curtain, D. B. Donaldson, M. A. A. El Gayer, D. M. Forsyth, I. Gitlitz, I. G. Graber, Y. H. Karara, A. Klar, Kathleen M. McCusker, M. Macintyre, A. F. McInnes, Amy Mooney, A. S. Neilson, O. M. Neshamkin, D. J. M. D. Roper, A. R. C. Salem, W. J. H. Sayers, A. H. M. Shouman, J. A. Sinclair, B. M. Singh, A. W. Smith, B. Solomon, W. J. Stevenson, G. H. Vawda, R. Williams.

Medical Notes in Parliament

Pension Appeal Tribunals

Major MILNER asked the Minister of Health whether he could, if required, provide or make available a maximum of 50 medical men for the staffing of pensions appeal tribunals, either permanently or on the understanding that they could be released on short notice if urgently required for other purposes. Miss HORSBRUGH said that the pressure on the services of medical men was so severe that it would be difficult to supply those suitably qualified for this work in the numbers indicated. Any new obligation imposed upon the medical profession in war conditions would prejudicially affect other services. Major MILNER: May we take it that though it is difficult it is not impossible? Sir FRANCIS FREMANTLE: Is proper attention being given to the possibility of employing men who are discharged from high positions in different Services, who are men of great experience and could be used for this kind of work? Miss HORSBRUGH: Yes.

Dr. HADEN GUEST asked if it was not the case that a certain number of medical men in the Services were retired on account of age or of having held high rank for a certain period, and if there were not enough of these people fully to fill all the requirements of pension appeal tribunal purposes. He knew positively and could give Miss Horsbrugh a list of these people who would fill all these places. Miss HORSBRUGH said she hoped Dr. Guest would send her that list as soon as possible.

Discharge of Doctors from the Service

Asked the approximate number of medical men who, on whatever grounds, had left the Army during the present war, Sir JAMES GRIGG stated that about 800 qualified medical men had left the Army during the present war. Major MILNER asked if it was not the fact that many of these medical men were quite suitable for utilization in other capacities in the Army, and that they were all qualified medical men who had been removed from the Army or had received their discharge, or something of that sort. Sir JAMES GRIGG said that a great many of them—more than half, in fact—had been invalided out.

Non-medical Commissions in the R.A.M.C.

On Oct. 20, in reply to Mr. H. N. Linstead, Sir JAMES GRIGG, Secretary for War, stated that pharmacists trained in zoology and physiology serving in the R.A.M.C. or newly recruited would be eligible for consideration for appointment to non-medical commissions in the R.A.M.C. They would normally be commissioned as second lieutenants, but would be eligible for promotion to war substantive lieutenant after 6 months. Selected officers would be eligible for promotion to captain as and when vacancies arose.

Progress in Rehabilitation

Mr. R. J. TAYLOR opened on Oct. 22 a debate on rehabilitation in industry. He said that between 1928 and 1938 accidents in mines and quarries numbered 1,600,000 and in all other industries 1,600,000. From 10% to 15% of the persons affected would be cases for rehabilitation. He praised the work done at Mansfield Rehabilitation Centre and said treatment there so helped spinal cases that the men were able to go back to their own work.

Mr. BERNARD TAYLOR spoke of the close co-operation between the safety and welfare officers appointed by two colliery companies in Nottinghamshire and the surgeon in charge of the Mansfield centre. The work was carried on even after a man re-entered the industry. Of 400 consecutive fracture cases among employees of the Bolsover Colliery Company, 389 of the patients returned to productive work and 378 to their pre-accident work. Those who could not return to the mining industry were turned over to the Ministry of Labour, which had facilities for training.

Mr. TOMLINSON, for the Ministry of Labour, said the process of restoring lost muscle tone and the full functions of the limbs and of maintaining general health and strength should begin as soon as the patient's condition permitted, and should be a continuous process. When restoration in the medical sense had been achieved, social and industrial experts, in consultation with the medical experts, should decide whether the patient could return to his former occupation or to what occupation. In the Emergency Hospitals Scheme many orthopaedic centres had been established with a full range of facilities. Other hospitals had been noted for fracture cases. At least a skeleton service was available. The people responsible for the work at Roehampton had been pioneers in a vital

cause. Twelve months' experience had been gained of the scheme introduced by Mr. Bevin in Oct., 1941, for training and resettlement of disabled people. A greater scheme might emerge from this. The psychological effect of interviews in hospital which brought home to the individual the possibility of returning to work was great. The scheme had been extended to all types of industry, and up to the end of August 41,000 people had been interviewed. Of this total about 29,000 had been placed in or found employment. Of 600 blind persons interviewed, 200 had been placed in employment other than that previously deemed suited for the blind. Many blind persons were to-day doing jobs in engineering shops. Treatment and training centres at Exeter and Leatherhead had been taken over by the Ministry of Labour.

Venereal Disease

Mr. BARSTOW on Oct. 22 asked whether the Minister of Health proposed to take steps to enforce compulsory notification of venereal disease, having regard to the increase in these diseases throughout the country. Mr. BROWN replied that he was considering what action could most appropriately be taken to check the spread of venereal disease. At present he doubted whether compulsory notification was best calculated to secure this object. He further told Colonel Heneage that he was aware of the difficulties of dealing with carriers of venereal disease. He had under urgent consideration the most effective methods of dealing with them.

Service Discharge for Tuberculosis

Sir WALTER WOMERSLEY said on Oct. 22 that of the total number of men invalided out of the Forces from the outbreak of war until the end of Sept. last 5.8% were discharged on account of tuberculosis. Of the claims made in respect of this disability rather more than 70% had been allowed.

Small-pox

The Secretary of State for Scotland was asked whether he was aware that there were errors in regard to the vaccinal condition of 5 out of the 33 cases of small-pox which occurred in Glasgow, and whether he would insist that the Department of Health for Scotland ascertained all facts more accurately in future. Mr. JOHNSTON said he was aware that subsequent investigation elicited further information about the vaccination history of certain small-pox patients. The original statements of the patients and their friends were checked by further inquiries as pressure of work more essential to the control and eradication of the disease permitted. At any given date, the Department of Health for Scotland could only ascertain from the local authority concerned the position according to the evidence then in the authority's possession. Asked whether, in view of the serious risks likely to result from the failure of ship doctors to notify cases of small-pox on vessels arriving in this country from oversea ports, as happened at Glasgow on May 29 last, he would consider the desirability of issuing a special memorandum to such doctors on the diagnosis of that disease, Mr. Johnston said that this suggestion would be considered in current discussions between the Health Departments and the Ministry of War Transport regarding measures of protection against seaborne infection.

Notifiable Diseases

Mr. BROWN has furnished the following statistics of the incidence in Great Britain during the past 5 years of diphtheria, cerebrospinal fever, measles, pneumonia, and whooping-cough. Mr. Brown remarked that only certain forms of pneumonia were notifiable, and compulsory notification of measles and whooping-cough was not introduced till late in 1939.

Year	Diphtheria	Cerebro-spinal Fever	Measles	Pneumonia (Primary or Influenzal)	Whooping-cough
1937	61,341	1,140	—	55,896	—
1938	65,008	1,288	—	45,160	—
1939	47,349	1,506	—	42,307	—
1940	46,260	12,767	409,593	47,877	53,630
1941	50,935	11,073	409,531	50,921	173,319
1942 (First six mths.)	20,340	4,252	100,762	27,528	36,861

Admission to Medical Schools

Sir E. GRAHAM-LITTLE asked on what the Minister of Health based his allocation of quotas of admission of students to individual medical schools. Mr. BROWN said that by arrangement with the Minister of Labour quotas for male medical students at each medical school were based normally on the average yearly admissions over the three years 1936 to 1939. In certain cases a variation to suit local conditions was allowed on the advice of the Chief Medical Officer of his Department after considering the representations of the school authorities. Quotas for women students were similarly fixed on the basis of the average admissions for the three years 1937 to 1940. Where the number of male applicants fell short of the quota for men, no objection was raised to the admission of women to make up the deficiency if the school so desired. He had no authority to make a quota conditional on acceptance by the school concerned of a certain proportion of women students. That issue was under consideration by the Committee on Medical Schools.

Incidence of Industrial Dermatitis.—On Oct. 20 Mr. BEVIN told Mr. Pritt that cases of industrial dermatitis notified to the Ministry of Labour in 1941 and 1940 numbered 7,291 and 4,744 respectively. A total for this year was not available. Posters were widely exhibited in factories where there was a special dermatitis risk, and preventive measures were also promoted through medical and welfare supervision, supervision of washing arrangements, and in other ways.

Rural Doctors' Petrol.—On Oct. 20 Mr. SCOTT asked the Minister of Fuel and Power if he was aware of the inconvenience suffered by doctors in country districts by the present petrol restrictions and the consequent danger to public health, and if he would consider depositing extra petrol coupons with the local police, to be issued to doctors and ambulance drivers in cases of emergency when their own supply was exhausted. Mr. LLOYD: In consultation with the British Medical Association arrangements have been made to secure that no doctor shall be hampered by lack of petrol for his essential professional journeys. I am not aware of any failure of these arrangements, but I shall be happy to consider any case of which Mr. Scott will give me particulars.

Notes in Brief

The number of persons in Great Britain insured under the National Health Insurance Acts at the end of 1940 (the latest date for which the information is available) was approximately 22,300,000.

Mr. Bevin is advised that it is not necessary to make industrial dermatitis a notifiable disease.

A scheme has been framed for financial assistance on demobilization to men and women who were pursuing courses of study at universities before being embodied in the Forces.

According to sample statistics taken earlier this year about 1% of recruits examined under the National Service Acts are rejected on account of pulmonary tuberculosis.

Medical News

At a meeting of the Committee of Management of the Medical Insurance Agency on Oct. 28, the Chairman, Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., resigned this post, which he has held since 1924 continuously. A resolution expressing high appreciation of his long and valuable service was passed by the Board and ordered to be entered in the minutes. Sir Robert Hutchison, Bt., M.D., was appointed as his successor.

The Pharmaceutical Society of Great Britain has arranged a lecture on "Nutrition," to be given by Prof. J. C. Drummond, scientific adviser to the Ministry of Food, at Friends House, Euston Road, N.W., on Thursday, Nov. 12, at 2.30 p.m.

From Nov. 8 to 22 inclusive a National Exhibition of Soviet Life in War and Peace will be held at the Wallace Collection, Hertford House, London, W. During the fortnight a comprehensive programme of events has been arranged. Among them is an address on Nov. 12, at 1 p.m., by Dr. Joan McMichael, who will speak on the medical services in the Soviet Union. Films will be shown on various aspects of Soviet life throughout the fortnight at 4 p.m. every day.

A sessional meeting of the Royal Sanitary Institute will be held at the Royal Beach Hotel, Southsea, on Saturday, Nov. 14, at 10.45 a.m., when papers will be read by Dr. A. G. Shand on "Diphtheria Immunization, with Special Reference to the Work of a Mobile Clinic," and by Dr. J. W. Thornton on "Wartime Disinfestation."

A lantern lecture on "The Future of Health and Hospitals from an Architect's Point of View" will be given by Mr. Charles E. Elcock, F.R.I.B.A., in the Physics Lecture Theatre, Royal Fort, University of Bristol, on Friday, Nov. 27, at 2.30 p.m., under the auspices of the Bristol and District Divisional Hospitals Council.

Among its other activities the Free German Institute of Science and Learning arranges courses of lectures on scientific and medical subjects. The programme for the period ending Dec. 15 can be had from the Secretary, 16, Buckland Crescent, N.W.3.

Dr. W. R. Wooldridge, president of the National Veterinary Medical Association, has announced the formation of a Veterinary Educational Trust to raise and administer funds for providing better facilities for the education of veterinary surgeons.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* there was a rise of 25%, 1,146 cases, in the incidence of measles. The other large variations were increases in the notifications of scarlet fever, 90, and acute pneumonia, 67; and decreases in the incidence of whooping-cough, 65, and diphtheria, 20. The first case of typhus reported in the country for thirteen years occurred in Bournemouth C.B.; the last case was in Sunderland C.B. during 1929.

The rise in measles was general throughout the country, but was most pronounced in the adjacent counties of Yorks West Riding, Lancashire, and Cheshire; the notifications in these counties were 523, 170, and 120, respectively, higher than the totals of the preceding week.

Scarlet fever has been on the upgrade for eight consecutive weeks, the number of weekly notifications being larger than at any time since the autumn of 1937. The only variation of note in the incidence during the week reviewed was an increase of 33 cases in Essex.

Exceptions to the general decline in diphtheria were the rises in Staffordshire, 25, and Durham, 22. The largest fall was that of Lancashire, where there were 41 fewer cases.

The trend of whooping-cough, although decreasing for the whole country, fluctuated within the counties. The largest of these variations in the incidence was a drop of 46 in London.

The number of cases of dysentery has fallen by one-third during the past month, but the incidence is still at a high level. During the week there was a fresh outbreak in Hertfordshire, 28 cases (Bishop's Stortford U.D. 22, Hertford M.B. 4, Hertford R.D. 2). An increase of 9 was recorded in the totals for Norfolk, 27 cases, and Northumberland, 14. In Yorks North Riding notifications fell from 30 to 11, and in Wales from 46 to 15.

In *Scotland* there were substantial rises in the notifications of measles, scarlet fever, and dysentery. The rising trend of each of these diseases was due mainly to the experience of only one town: Edinburgh experienced a rise from 63 to 113 in the number of cases of scarlet fever; in Paisley measles went up from 68 to 120 cases; Dundee with 36 cases of dysentery had almost half of the total notifications.

In *Eire* an increase was reported in the notifications of measles, diphtheria, scarlet fever, and whooping-cough. Whooping-cough was confined to two areas: Dublin 41, and Co. Clare (Kilrush R.D.) 17. Almost half the recent cases of measles have been recorded in Co. Mayo (Castlebar R.D.). The outbreak of poliomyelitis persists, and the hope that with the onset of the colder weather the incidence would drop sharply has not been realized. Since July there have been 137 cases, with 34 deaths.

Diphtheria Immunization

Out of the 1,440 local authorities in England and Wales, 685 have reported to the Ministry of Health that up to the end of June 50% or more of the children aged between 5 and 15 had been immunized in their areas.

Small-pox

There have been no fresh cases in the Methilhill outbreak, Fife, but a suspected case, a contact from Methilhill, has been reported in the Larkhall district of Lanark. The movement of contacts has caused concern and, according to the Press, almost led to a strike at the local colliery because contacts were allowed to return to work. According to statements in the Press on Nov. 3, 2 cases of small-pox have been reported in Edinburgh and 1 in Belfast.

Returns for the Week Ending October 24

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 2,619, whooping-cough 984, diphtheria 971, measles 6,803, acute pneumonia 659, cerebrospinal fever 66, acute poliomyelitis 25, dysentery 177, paratyphoid 7, typhoid 12.

From a study of 706 State nurses in 6 different municipal hospitals, D. R. Hastings and D. G. Behn (*Amer. Rev. Tuberc.*, 1941, **44**, 681) conclude that the extent of tuberculosis and of tuberculin-positive reactors is no higher among girls about to enter training than for any similar group of young women. The infection rate, as measured by a change from a negative to a positive tuberculin reaction, is about 11.6% higher for those nurses who spend a certain portion of their training period on tuberculosis service. At the beginning of training 96.3% of the girls had completely negative *x*-ray films. At the end of three years of training the figures were 93.3% for nurses on tuberculosis service and 94.8% for those on general nursing. Tuberculin-positive nurses, the authors point out, are much less likely to develop tuberculosis during training than are tuberculin-negative nurses.

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INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Oct. 17.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1942 (a)	(b)	(c)	(d)	(e)	1941 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	59	6	20	2	—	110	4	31	—	3
Deaths		—	—				1	1		
Diphtheria	971	53	218	85	25	1,034	41	300	34	36
Deaths	15	1	4	2	1	34	—	5	1	
Dysentery	165	18	78	—	—	207	11	100	—	
Deaths		—	—	—	—		—	—	—	
Encephalitis lethargica, acute	2	—	1		—	2	—	—		
Deaths		1	—				—	—		
Erysipelas		—	61	4	—		—	63	2	5
Deaths		1	—				—	—		
Infective enteritis or diarrhoea under 2 years	55	7	11	98 16	4	42	3	17	34	15
Deaths										
Measles	5,796	291	353	45	18	787	41	18	54	2
Deaths	2	—	1	—	—	3	—	—	—	—
Ophthalmia neonatorum	92	3	17	—	—	89	6	13	—	—
Deaths										
Paratyphoid fever	6	1	—	—		64	4	12	—	
Deaths	—	—	—		—	—	—	—	—	
Pneumonia, influenzal*	608	32	2	1	1	705	25	3	2	7
Deaths (from influenza)	17	1	1	1	—	11	18	4	—	7
Pneumonia, primary			139	21				184	9	
Deaths		—		9	4		—		2	7
Polio-encephalitis, acute	1	—				4	—			
Deaths		—					—			
Poliomyelitis, acute	24	3	2	22	—	38	3	9	6	
Deaths		—	—				—	—		
Puerperal fever	—	2	17	4	—	1	1	5	3	1
Deaths		—					—			
Puerperal pyrexia	133	5	18		2	144	14	16		—
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	2,703	175	430	81	35	1,336	35	258	48	29
Deaths	3	—	—	1	—	—	—	—	—	—
Small-pox	—	—	21		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever†	6	1	1	12	1	23	2	1	12	1
Deaths	1	—	—	—	—	1	—	1	—	—
Typhus fever	1	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	907	50	34	61	8	1,970	227	68	23	8
Deaths	5	—	—	2	—	9	3	1	—	—
Deaths (0–1) year)	359	31	69	49	23	289	28	53	42	25
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	3,880	535	542	201	113	3,690	476	509	166	110
Annual death rate (per 1,000 persons living)			12·2	13·4	‡			11·1	11·0	‡
Live births	6,033	727	945	377	252	5,153	460	892	304	210
Annual rate per 1,000 persons living			19·5	25·2	‡			18·1	20·2	‡
Stillbirths	202	18	44			207	11	36		
Rate per 1,000 total births (including stillborn)			44					39		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Letters, Notes, and Answers

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QUERIES AND ANSWERS

Anaemia in Young Adults—Dietetic?

Dr. G. D. SUMMERS (Lincoln) writes: I was interested to read Mr. A. J. Hobson's letter (Oct. 17, p. 467). I can report a dietetic anaemia of similar symptoms locally among women and girls between ages 11 and 31. I first noticed it 6 months ago, and increase in numbers is progressive. A patient aged 40 with a similar anaemia had given a pint of blood 7 weeks previously. I suggest as causes: (1) Mother feeds up the men and boys at the expense of the girls and herself. (2) The great lack of eggs locally since they were collected for the larger towns, nothing coming back to the countryside to replace them. Parsley is said to be good for one. Can any of your readers tell me whether it contains iron or any vitamin, please?

Infra-red Radiation for Migraine

Dr. OLIVER SPRINGER (Glasgow) writes: In reply to Dr. E. V. Claydon (Oct. 17, p. 472) I do not think that the case mentioned was a true migraine, as any such patients who have been under my care, and who have been complaining about the usual sensory phenomena, have never reacted to infra-red radiation. I have, however, obtained excellent results, in cases of recurrent headaches, by treating the fibrositis at the back of the neck with heat and massage. I have never had any ill effects from the application of infra-red radiation to my head or that of any of my patients.

Aspirin for Asthma

Dr. H. THISTLETHWAITE (Sedbergh) writes: Dr. W. Lees Templeton (Oct. 24, p. 503) appeals to logic to justify homoeopathic doses (of aspirin). I have had some training in logic, but can construct no valid syllogism from the premises given. The argument appears to stand thus: 10A causes X in B ; 2A relieves X in C; ∴ 2A will relieve X in D, E, F, and G, not to say in B also. As I once unintentionally practised this argument upon an A-sensitive patient with a proprietary mixture containing 1¼ gr. of sodium salicylate per dose I am in a position to state that the only possible conclusion in my logic is that even 1¼ A causes X in B. I hope I make myself clear.

Income Tax

Pension under Superannuation Act

"D.P.H." is in receipt of a pension granted by a local authority under the Superannuation Act and has claimed exemption from tax on it on the ground that his retirement, and therefore the grant of the pension, was occasioned by permanent impairment of health attributable to work in connexion with civil defence and supervision of military accommodation. The inspector of taxes has refused his claim.

*** We cannot advise "D.P.H." to appeal against the inspector's decision. Such a pension does not fall within the various classes of disability pensions specified in Sec. 16 of the Finance Act, 1919, nor is it paid by the Ministry of Pensions in respect of war injury. The war has accelerated the grant of the pension, but its nature and source are unaffected.

Pension for Military Service

"Ex-R.A.M.C." has been discharged owing to chronic illness contracted while on active service. He is at present being paid an allowance by the Ministry of Pensions at the rate of £195 per annum. Is this allowance subject to United Kingdom income tax?

*** The question is governed by section 1B of the Finance Act, 1919, which provides that "(*h*) retired pay of disabled officers granted on account of medical unfitness attributable to or aggravated by naval, military, or air force service . . . shall be exempt from income tax." The section provides further that "where the amount of any retired pay or pension to which the section applies is not solely attributable to disablement or disability the relief [i.e., the exemption] shall extend only to such part as is certified by the Ministry of Pensions . . . to be attributable to disablement or disability." Presumably "Ex-R.A.M.C." will be entitled to the exemption.

LETTERS, NOTES, ETC.

A Light Trailer Ambulance

Dr. T. J. T. WILMOT (Louth, Lincs) writes: Dr. K. Vernon Bailey's letter (Sept. 5, p. 296) raises a question that is of great importance throughout the country. Ambulances of many types have been improvised everywhere, but a means of dealing with stretcher cases before ambulances are available is likely to be a major problem. Ambulances will not always be able to get very near their cases, and also may not be allowed to discharge these in the immediate proximity of a hospital. Therefore, as Dr. Bailey has pointed out, some means of doing away with, or at least easing, stretcher-bearing is essential. In this large area of scattered small villages we are trying to solve the problem by having small carriers made by local handymen, each for one stretcher, that can be moved by one person. These are made from old cycle wheels and front forks braced together and fixed at the top to the outside of a wooden frame on which a stretcher can be placed. The weight of a patient keeps this fairly well in position, but four projecting pieces of wood at the corners improve the stability. A leg is also necessary to allow of the carrier being rested. One on a hinge was first tried, but as this was found difficult to work by one person while also supporting the stretcher, a fixed leg has now been found better, even though it has to be somewhat short and does not give a quite level position on standing. These carriers are very rough and inexpensive, but will, I believe, do the job for which they are designed. A cycle manufacturing firm has been approached and is considering the possibility of making carriers somewhat on the above lines.

R.A.M.C. Training: Some Hints

H. D. McC. writes: May I make a few suggestions which may be helpful to medical men, especially the older ones, who may be called up and go to No. 1 Depot R.A.M.C. for training: (1) Be vaccinated and have your T.A.B. inoculation at your leisure before you go. (2) A bicycle is very useful as the Mess is 1½ miles from the camp. (3) Break in a pair of boots. (4) A pillow is a great comfort, as the Army ones are hard. The adoption of these suggestions will increase the comfort and render the course not only interesting but pleasant.

MEDICINE 100 YEARS AGO

Extracts from a leading article in the *Provincial Medical Journal* of November 5, 1842:

"A case was tried last week at Barnstaple which requires notice, as it involves a point of law materially affecting the interests of the medical profession. Mr. Joce, a respectable general practitioner, residing at Barnstaple, brought an action against a lieutenant in the navy, named Shapland, for medical attendance. The defendant pleaded the statute of limitations with respect to a large portion of the debt; the remainder, £2 19s. 9d., he admitted on the record.

"It is unnecessary for us to notice the opening speech of Mr. Joce's counsel, as it referred to matters unconnected with the point to which we are desirous of directing attention. This point is the alleged necessity of proving the seal of the Apothecaries' Company, in cases where an action for debt is brought by a member of the company. On the part of the plaintiff, Mr. Joce, an attempt was made to prove the seal by the evidence of several medical men, who had formerly received licences from Apothecaries' Hall, and who testified to the similarity between the seal attached to Mr. Joce's license and their own. Mr. Praed, the Recorder of Barnstaple, before whom the case was tried, decided that such evidence was insufficient. . . . Mr. Joce's counsel was not prepared to bring forward any evidence of the kind required by the court, and Mr. Joce was accordingly non-suited. . . .

"The point of law upon which Mr. Joce was defeated is by no means a new one; it has been debated over and over again in courts of justice. It is agreed upon all hands that the certificate must be proved, and the only question which remains is, what is considered sufficient proof in a court of law. The Recorder of Barnstaple seems to think that it is necessary to prove the seal of the court, but herein we believe him to be in error. Several of the judges have decided that it is merely necessary to produce the original certificate granted to the plaintiff, and to give reasonable evidence of its being a genuine document. This may be done by proving the signature of one or more of the persons whose names are attached to the certificate as examiners, and showing that such persons acted as examiners at the time of signing the document."